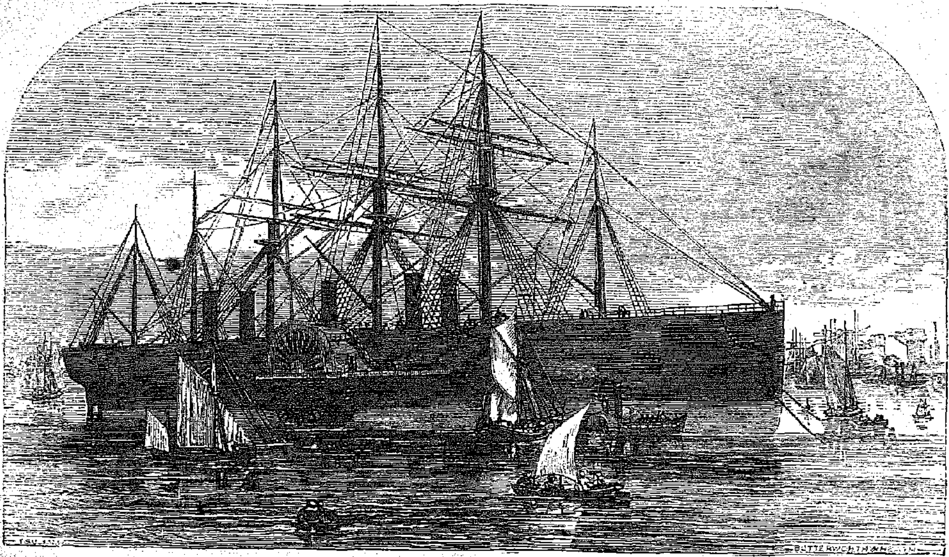

"THE GREAT EASTERN" STEAMSHIP.

WONDERFUL THINGS

OR

ACCURATE AND INTERESTING DESCRIPTIONS

OF THE

WONDERS OF ALL NATIONS.

WITH NUMEROUS ILLUSTRATIONS ON WOOD.

FIRST SERIES.

TENTH THOUSAND.

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NOTHING awakens so much interest, or exercises such a deep and abiding influence upon old and young, as the Wonderful in Nature and Art with which the world is filled. It is in search of the wonderful, or at least under the stimulus of the sentiment, that the traveller visits distant countries, and the man of science explores the hidden things of Nature. This sentiment is the pioneer of all progress of knowledge, in discovery, and, we might add, in religion, for the wonders of Nature expand our views of God, as the wonders of Art ennoble our views of the capacity and destiny of Man. The sentiment was powerful in the early ages of the world, else the wonders of Egypt and Nineveh never had come into being. It is still strong, though taking a different direction, amidst the bustle of trade and commerce, else the Crystal Palace had never risen in its magic splendour, and had never drawn its thousands and millions within its walls. In the minds of the young, the sentiment is ever fresh. To furnish it with food, which shall be both instructive and entertaining, as well as elevating in its moral tone, is the object of the following work. We propose to exhibit to our readers, by the help of the pencil and the pen, the most palpable wonders of ancient and modern times. From the earliest ages, when the ears of childhood listened to the story of the Seven Wonders of the World, from the lips of sage or sire, down to the present time, similar collections of the marvels and miracles discovered or achieved by human genius have been in constant demand. The work now about to be issued will differ from all its predecessors, of the same class, in being more comprehensive, more systematic, more carefully prepared, and better illustrated. It will be truly an Exhibition of the Wonders of all Nations; and to our young readers especially, we cannot doubt that it will be a welcome and prized addition to their juvenile libraries.

London,
March, 1866.

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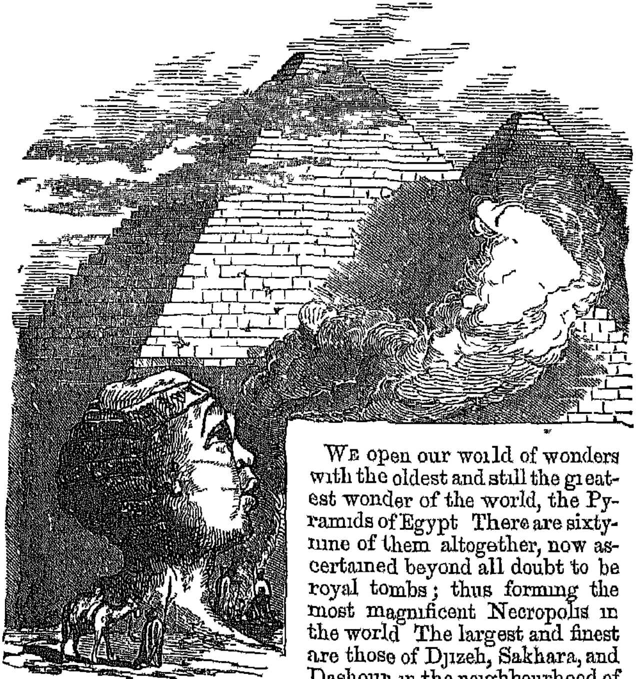
Wonderful Things.

THE PYRAMIDS OF EGYPT.



We open our world of wonders with the oldest and still the greatest wonder of the world, the Pyramids of Egypt There are sixty-nine of them altogether, now ascertained beyond all doubt to be royal tombs; thus forming the most magnificent Necropolis in the world The largest and finest are those of Djizeh, Sakhara, and Dashour, in the neighbourhood of Cairo. We cannot describe them all, nor is it necessary Those *of Djizeh are the most conspicuous, standing upon a bed of* rock 150 feet above the desert, and 150 feet above the river. Of this group the Great Pyramid will chiefly occupy our attention. We shall best describe it by taking the reader with us in an imaginary visit to this world-famed structure.

It is singular to notice the deception created by their great size on the one hand, and the clearness of the atmosphere on the other. At first they appear neither very high, nor very distant; so that we expect to reach them soon after they appear in sight. But we travel on, and they appear no larger nor nearer. All large objects are deceptive in this way. Large hills, large buildings, famous waterfalls—even the Himalayas, St. Peter's, and Niagara, at first sight disappoint the traveller, especially when the atmosphere is clear, and there are no intervening objects to act as a set-off to the largest. But this primary disappointment invariably gives place to the full measure of wonder naturally inspired by the scene. It is so with the Pyramids.

"They certainly," says one traveller, "have an awful look—everlasting as it were—compared to any other structure which you have either seen or can imagine." Dr. Clarke thus describes his first view of them at sun-rise from the Nile-boat. "We hastened from the cabin; and never will the impression made by their appearance be obliterated. By reflecting the sun's rays, they appeared as white as snow, and of such surprising magnitude, that nothing we had previously conceived in our imagination had prepared us for the spectacle we beheld. The sight instantly convinced us that no power of description, no delineation can convey ideas adequate to the effect produced in viewing these stupendous monuments. The formality of their structure is lost in their prodigious magnitude; the mind, elevated by wonder, feels at once the force of an axiom, which, however disputed, experience confirms, that in vastness, whatsoever be its nature, there dwells sublimity!"

Arrived at the confines of the great sand-heap which surrounds the rock upon which the Pyramids are built, we begin to ascend, our donkeys sinking in the sand at every step. At no great distance from the first Pyramid, in a deep sandy hollow, stands the world-famed Sphinx, which, however, we pass, as we are in a hurry to get to the Pyramid itself. Now we are at the foot of the stone mountain! The first step is before us, but to step on to it, or rather to step up, or climb up—*that* is the difficulty, for it is nearly as high as ourselves! There we stand, gazing upward, the eye glancing along from step to step, and almost wearied with reaching the summit, until we seem as mere insects in the presence of such a stupendous mass of solid masonry. The ground covered by the great Pyramid is equal to the area of Lincoln's-inn Fields, and 50 feet over every way—say including the square and the rows of surrounding houses. Its perpendicular height is 461 feet, being 24 feet higher than St. Peter's, and 117 feet higher than St. Pauls. The quantity of stone used in this Pyramid is estimated at six millions of tons, which is just three times that of the vast Breakwater thrown across Plymouth Sound. However, we must now try to get to the top, and here are some Arabs ready to help us. In

ASCENDING

we have to pursue a zigzag course, looking towards the face of the Pyramid, seldom looking down the deep distance below, though tempted now and then to gaze upward at the towering steps which seem to mount to the very clouds. It seems as if we had been a life-time on the journey, and as if it would never come to an end. But we toil on, and as we reached the bottom, so in due time we reached the top! Now then, we are at

THE PINNACLE OF THE PYRAMID!

There is room for standing, that is one comfort, and there is accommodation for sitting, that is a greater comfort, for by this time we are pretty well tired. The surface of the pinnacle is thirty feet square, with a layer of stone blocks somewhat raised in the centre, upon which we take our seats while surveying the wide and wonderful prospect around and below us.

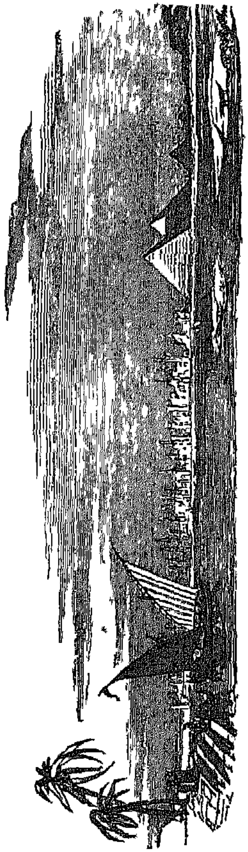
Stretching away to the north and east, the eye rests upon one of the most fertile spots in the world—the valley of the Nile—teeming with fruitfulness, while the wonderful river, the source of all this wealth, is winding away to the sea, leaving behind it innumerable shining lakes or canals glistening in the sunshine. On the opposite side of the river gleams the white houses, and the towers and minarets of Cairo, with the island of Rhoda; while nearer still, between us and the city, are countless villages embosomed amid the palm-trees. At our feet lie the irregular hillocks of yellow sand, and the mysterious monument of the Sphinx. The contrast on the west is wonderful enough; for there the yellow sand hills of the Libyan desert, without one particle of vegetation, present the aspect of eternal nakedness. There is something awfully sublime, and almost fearful, in this intense desolation. Upon the south, the Pyramids of Sakhara, Abousier, and Dashour, seem spread out like so many tents, or like some great encampment upon the edge of the desert. As we stand upon this hoary summit, we seem, also, to look back into the night of immeasurable antiquity. On the plain below was slowly developed that civilization, that "wisdom of the Egyptians," which descended as a heritage to other nations. There is no spot on earth so venerable as the plain of Memphis, as there are no monuments like the Pyramids. Could we have stood on the same spot 3000 or 4000 years ago, what a scene would have spread out before us! Stretching for miles and miles along the raised edge of the desert, we should have beheld these sixty mausolea of the Memphian sovereigns overlooking their magnificent capital with its gorgeous temples and palaces extending to the Nile. And now, when we make arrangements for descending, we look for the steps, but from the top down to the very bottom, it seems like a smooth surface of an immense inclined plane, threatening to make our descent more precipitate than would be comfortable. By the way we got up, however, we get down without damage, and through an opening about two-thirds from the top, we enter and take a peep into

THE INTERIOR.

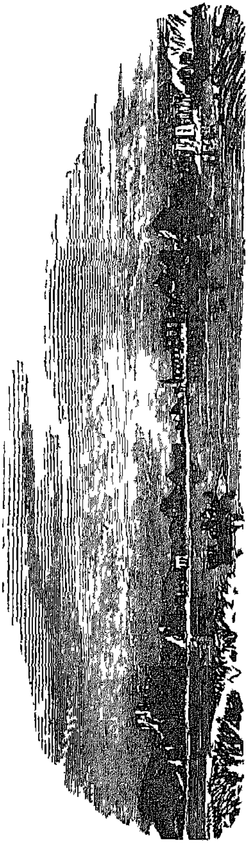
At the entrance, two large blocks, resting against each other, form a sort of pointed arch, and serve to take off the top-weight from the roof of the passage. The Queen's Chamber is in the centre of the Pyramid. The stones in the side walls are so well fitted together that the joints can scarcely be traced; and an incrustation of salt has tended still more to give them the appearance of having been hewn in the solid rock, which, however, is not the case. In the King's Chamber the roof is flat, and the side walls are of granite. It contains a sarcophagus of the same red granite, nearly seven and a half feet long, and only three inches narrower than the door by which it was admitted. It gives back, on being struck, a sound like a deep-toned bell. It has, however, been almost destroyed, not by Turks, but by travellers. There are small holes or tubes in the side walls for conducting air into the Pyramid. It is supposed to have been first opened about 1000 years ago, by one of the Caliphs, who expected to discover treasures inside, but found none save what he afterwards deposited on purpose himself, that he might not appear to have been befooled.

THE PURPOSE OF THE PYRAMIDS

Is involved in obscurity. There was long a unanimous opinion that they were the gigantic tombs of the Egyptian kings. All the Greek and Roman writers who have mentioned them, have this opinion of them. An ingenious theory has been



PYRAMIDS AND RUINS AT A DISTANCE.



RUINS AT A DISTANCE.

advanced by a modern French writer, Persigny, who supposes them to have been built in order to arrest the progress of the sands from the desert, and thus to have had the patriotic purpose of preserving the cultivated fields of Egypt from destruction. But the old opinion is still the most prevalent and best sustained. Along with one main design, however, collateral uses may have been intended and provided for in their construction.

SIXTY-NINE OTHER PYRAMIDS

Are scattered along the same side of the Nile, for more than a score of miles; but they have proved such convenient quarries for building purposes, that not more than half would now attract the eye of the passer-by, and the process of demolition goes on apace. Had the materials of the great Pyramid been as small as the stones of Dashour, it might, like some of those, be standing up now in palace walls at Cairo. The tombs at Sakhara undergo an equally curious transformation, sometimes into a government factory, sometimes into a pleasure-house for a pacha. The process of demolition, however, has not always been an easy one. Abdallatif relates of an Egyptian pacha that he was persuaded to overthrow the Red Pyramid, viz., that of Mycernius, and sent thither miners, sappers, and quarriers, who tried for eight months to execute their commission; but their utmost efforts, with people raising with picks and levers above, and pulling with ropes and cables below, could not remove above one or two stones a day: and after the stone was down at the foot of the Pyramid, they were obliged to break it in pieces in order to remove it; and one of the engineers is reported to have said, that although he were to get several thousand pieces of gold, he could not readjust one of these stones in its former place. If preserved from similar destructive efforts in future, they will last as long as the world! "All things dread Time; but Time dreads the Pyramids." At last they abandoned the attempt.

The same writer remarks: "These Pyramids are constructed of great stones, from ten to twenty cubits long, and two or three cubits in the breadth and thickness. The most admirable particular of the whole is the extraordinary nicety with which these stones have been prepared and adjusted. Their adjustment is so precise, that not even a needle or a hair can be inserted between any two of them. They are joined by a cement, laid on to the thickness of a sheet of paper." The wonder only increases when we begin to imagine how these huge indestructible piles were originally formed. The oldest historical information on the subject is that furnished by Herodotus, who visited them as objects of antiquity even in his day! His account of

THE BUILDING OF THE GREAT PYRAMID

states how Cheops closed the temples, stopped the sacrifices, and made everybody work for him:—how some quarried the stone in the Arabian hills, and others conveyed it to the river, and over a bridge of boats; and others drew it to the spot where it was wanted: and how it could be carried and mounted only by a causeway, which of itself took ten years to construct, and which was a fine work, with its polished stones and figures of animals engraved on them: how 100,000 men were employed at a time, and were relieved by the same number at the end of three months: how, besides the ten years occupied with the causeway, much was required for levelling the rock on which the edifice stands, and twenty years for the building of the Pyramid itself: how a machine, made of short pieces of wood, was placed on every step, as the work proceeded, to raise the stones for the step above; and how the filling in of these gradations, forming the last smooth surface, was begun from the *top:* how this surface bore engraved (so that Herodotus himself *saw* it) an inscription which told the expense of the vegetables eaten by the labourers during the progress of the work; and how confounded the traveller declares himself to be (judging from the sum spent in vegetables) at the thought of the expenditure further necessary for the rest of the food and clothes of the workmen, and their iron tools, during the long course of years required for the whole series of works.

"It is impossible (says Dr Clarke) to leave the Pyramids of Djizeh without some notice of the long list of philosophers, marshals, emperors, and princes, who, in so many ages, have been brought to view the most wonderful of the works of man. There has not been a conqueror pre-eminently distinguished in the history of the world, from the days of Cambyses down to the invasion of Napoleon Buonaparte, who withheld his tribute of admiration from the genius of the place. The vanity of Alexander the Great was so piqued by the overwhelming impression of their majesty, that nothing less than being ranked among the gods of Egypt could elevate him sufficiently above the pride of the monarchs by whom they were erected. When Germanicus had subdued the German empire, and seated "a Roman prefect upon the splendid throne of the Ptolemies," being unmindful of repose or of triumph, the antiquities of the country engaged all his attention. The humblest pilgrim, pacing the Libyan sands around them, while he is conscious that he walks in the footsteps of so many mighty and renowned men, imagines himself for an instant to be admitted into their illustrious conclave. Persian satraps, Macedonian heroes, Grecian bards, sages, and historians; Roman warriors, all of every age, nation, and religion, have participated, in common with him, the same feelings, and have trodden the same ground. Every spot that he beholds, every stone on which he rests his weary limbs, have witnessed the coming of men who were the fathers of law, of literature, and the arts.—Orpheus, Thales, Homer, Lycurgus, Solon, Pythagoras, Plato, Plutarch, contributed by their presence to the dignity of the place. Desolate and melancholy as the scene appears, no traveller leaves it without regret, and many a retrospect of objects which call to mind such numerous examples of wisdom, of bravery, and of virtue!

THE CHURCH OF THE HOLY SEPULCHRE.

AMONG the chief objects of attraction to the traveller who visits Jerusalem, the Church of the Holy Sepulchre has ever been the foremost. It is supposed to be built on the spot where Christ was buried; but it is unnecessary to add that this is a mere tradition. It was originally erected by the mother of Constantine, and no cost was spared to render the building answerable to the wealth and piety of those by whom it was planned. It continued to be the admiration of Christians till the year 614, when the Persian conqueror, Chesres, amid other acts of barbarous ferocity, burnt the venerable edifice to the ground. It was rebuilt in 628 by the emperor Heraclius; and when the caliph Omar became master of Jerusalem, he was so far from injuring the sacred pile, that he protected it by his commands, and honoured it by acts of personal piety. It remained till 1808, when it was utterly destroyed by fire, the flames sparing nothing in their ravages but the ornaments about the holy of holies. It has since risen again in all its ancient grandeur, and in the form in which it had for so many ages inspired the veneration of devout pilgrims. Sandys, speaking of the old building, says, "The roof of the temple is of a high pitch, curiously arched, and supported with great pillars of marble; the outward aisles galleried above, the universal fabric, stately and sumptuous." The Church of the Holy Sepulchre is contained within a cloistered circle, the lower portion of which is divided into several chapels, while that above affords a lodging for the numerous monks engaged in the service of the sanctuary. "This round (says the old traveller) is covered with a cupola, sustained with rafters of cedar, each of one piece; being open in the midst, like the Pantheon at Rome." *Maundrell* says, that it was so contrived as to contain under its roof twelve or thirteen sanctuaries, marking particular circumstances in the sufferings and resurrection of our Lord. These he mentions: first, the place where Jesus was derided by the soldiers; secondly, where they cast lots for his garments; thirdly, where he was shut up, while they dug the hole in which to fix the cross; fourthly, where he was nailed to the tree; fifthly, where the cross was erected; sixthly, where the soldier stood who pierced his side; and so on; each spot being surmounted by an altar, and regarded as a place for the exercise of some special act of devotion. The appearance of this remarkable place has been little changed by the fire of 1808. A traveller* whose descriptions are always lively and interesting, having spoken of the other remarkable places in the circuit of the church, thus describes the Chapel of the Cross: "Descending twenty-eight broad marble steps, the visitor comes to a large chamber, eighteen paces square, dimly lighted by a few distant lamps, the roof being supported by four short columns with enormous capitals. In front of the steps is the altar, and on the right a seat, on which the empress Helena, advised by a dream where the true cross was to be found, sat and watched the workmen who were digging below. Descending again fourteen steps, another chamber is reached, darker and more dimly lighted than the first, and hung with faded red tapestry. A marble slab, bearing on it the figure of the cross, covers the mouth of the pit in which the true cross was found. The next chapel is over the spot where our Saviour was crowned with thorns, and under the altar, protected by an iron grating, is the very stone on which he sat. Then the visitor arrives at Mount Calvary. A narrow marble staircase, of eighteen steps, leads to a chapel about fifteen feet square, paved with marble in mosaic, and hung on all sides with silken tapestry, and lamps dimly burning, &c. Removing a covering of silk, our traveller saw, by the aid of a lamp, a fissure in the rock, which, it is said, was rent asunder at the moment when our Saviour expired. Descending to the floor of the church, he saw this rent still more distinctly, and opposite to it a monument, covering, marvellous to be said, the head of Adam! Having accomplished the tour of the church, the visitor returned to the Holy Sepulchre itself. Taking off his shoes on the marble platform in front, he was admitted by a low door; and in the centre of the first chamber beheld the very stone said to have been rolled away from the mouth of the sepulchre. Again, stooping lower, he entered the inner chamber, "the holiest of holy places." "The sepulchre, (he says) is a marble sarcophagus, somewhat resembling a common marble bathing tub, with a lid of the same material. Over it hang forty-three lamps, which burn without ceasing, night and day. The walls are of a greenish marble, usually called verd-antique." Many a decent pilgrim has expressed his wonder and delight, that in 1808, when all the rest of the edifice was like a raging furnace, even the stones and marble pillars crumbling into dust beneath the fury of the flames, the very curtains about the holy tomb remained unsinged!

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* Stephens' "Incidents of Travel.'

This church still continues to be the great central object of attraction—the idol-temple—for all Christendom; and the most disgraceful scenes of rioting and bloodshed may still be witnessed around and within the "sacred walls," so well was it said by Him whom they profess to worship, "Ye worship ye know not what: the true worshipper worships the father in spirit and in truth."

THE MOSQUE OF OMAR.

The Mosque of Omar, occupying the site of Solomon's Temple, is, next to the Holy Sepulchre, though for different reasons, the most wonderful building in Jerusalem. This far-famed fabric is not so much a single mosque, as a collection or group of mosques. The Mussulmans, we are told, recognize only two temples as such; viz., their celebrated Mosque at Mecca, and the Mosque of Omar at Jerusalem. Both these edifices have a peculiar sanctity in their eyes; and both are closed, by the strictest laws, against Jews, Christians, and all, in short, who do not profess the faith of the Koran.

The Mosque of Omar forms a vast court or closed area, and is entered by a gate. It is composed of two magnificent masses of building, which might be regarded as separate temples, but for the contiguity, and symmetrical relation to each other. Of these grand divisions of the mosque, the one is called *El-Aksa*, and the other *El-Sakhara.* El-Aksa consists of seven naves, which are supported by pillars and columns. The centre nave is terminated by a splendid cupola. Two other naves open to the right and left of the main body of the building, which is approached by a portico of seven arcades in front, and one in depth, resting on massive square pillars. The cupola is supported by four grand arches, resting also on square pillars, decorated by fine columns of brown marble. The structure itself is spherical, with two lines of windows, and is ornamented with paintings and beautiful golden arabesques. Immediately in front of the principal gate of the Aksa, is a noble causeway 284 feet long. In the middle is a beautiful marble basin, with a fountain in the form of a shell. At the end a magnificent flight of steps conducts to the Sakhara; and the whole appearance of this part of the mosque is calculated to inspire admiration for its beauty and extent. But contrasted with all this grandeur, are several buildings of the most wretched description, raised against the left side of the Aksa, and intended as residences for the numerous officers engaged in the service of the mosque.

The other division of the temple, called El-Sakhara, derives its name from the *rock* in the centre, about which so many wonderful things have been told, and which is consequently an object of the profoundest veneration among the devout Mussulmans. The edifice rises from a vast platform of 460 feet in length, and 399 in width, being elevated sixteen feet above the general plane of the temple. It is ascended by eight flights of steps; and in the middle of this marble platform stands the Sakhara, the form of which is octagonal. It is externally incrusted with different kinds of marble to half its height; little square bricks of different colours forming a coating for the remainder. Each of the octagons is furnished with five large windows, of splendidly painted glass, in arabesques.

The plane of the *central circle* of this remarkable edifice is raised three feet above that of the surrounding naves; and is enclosed by a lofty and magnificent railing of iron, gilt. Within this mysterious round stands the sacred rock, called *El-Sakhara-Allah.* According to the Mahommedan notion, this is the place whence, with the single exception of Mecca, the prayers of men ascend most acceptably to heaven.

The space between the west side of the court El-Sakhara and El-Aksa is occupied by several square platforms, paved with beautiful marble, for the Imauns, whose office it is to direct the prayers of the faithful. Between the platforms, and in other parts of the great courts of the temple, are several cisterns ornamented with marbles, columns, and cupolas, which serve as reservoirs for the rain-water, to be distributed among the people. According to common report, the entire area of the Aksa is undermined; and a staircase is spoken of, near the principal gate, by which a descent is occasionally made to the vast vaults beneath.

Of the few European travellers who have penetrated into the interior of the mosque, one of the most successful was Dr. Richardson, who was introduced by a patient out of gratitude for his professional services. His account confirms the universal report as to the general extent and magnificence of the edifice; but it is too long and minute for extract.

THE MOSQUE OF ST. SOPHIA

Is the most celebrated of the mosques in Constantinople. Miss Pardoe thus describes it as seen by lamp light, at the time of prayer.

"On passing the threshold, I involuntarily shrank back before the blaze of light that burst upon me. Far as the eye could reach upwards, circles of coloured fire, appearing as if suspended in mid-air, designed the form of the stupendous dome; while beneath, devices of every shape and colour were formed by myriads of lamps of various hues: the imperial closet, situated opposite to the pulpit, was one blaze of refulgence, and its gilded lattices flashed back the brilliancy, till it looked like a gigantic meteor. As I stood a few paces within the doorway, I could not distinguish the limits of the edifice—I looked forward, upward—to the right hand, and to the left; but I could only take in a given space, covered with human beings, kneeling in regular lines, and at a certain signal bowing their turbaned heads to the earth; while the shrill chanting of the choir pealed through the vast pile! And this was St. Sophia! To me it seemed like a creation of enchantment—the light—the singing voices—the mysterious extent, which baffled the earnestness of my gaze—the 10,000 Moslems—the bright and varied colours of the dresses—all contrived to form a scene of such unearthly magnificence, that I felt as though there could be no reality in what I had looked on, but that, at some sudden signal, the towering columns would fail to support the vault of light above them, and all would become void."

THE GREAT WALL OF CHINA.

The Great Wall of China ranks next to the Great Pyramids of Egypt among the Wonders of the World, being as remarkable for extent as the latter is for solidity and size. Father Gerbillon, a Catholic Missionary, who travelled along the chief part of it, says, "It is indeed one of the most surprising and extraordinary works in the world; yet it cannot be denied that those travellers who have mentioned it have over-magnified it, imagining, no doubt, that it was in its whole extent the same as they saw in the parts nearest Pekin, or at certain of the most important passes, where it is indeed very strong and well built, as also very high and thick." He states that from the Eastern ocean to the frontiers of the province of Chan-si, or for the distance of 200 leagues, it is generally built of stone and brick, with strong square towers sufficiently near for mutual defence, and having besides at every important pass a formidable and well-built fortress. In many places in this part the wall is double and even triple. But toward the western extremity, it is nothing but a terrace of earth. In many places it is carried over the tops of the highest and most rugged rocks, as may be seen by the above illustration. Our missionary-traveller wonders how stones and bricks could be carried to such places, or how the Chinese could construct vast forts on spots where the boldest European architects would not attempt to raise the smallest building. It is made of two walls of brick and masonry, not above a foot and a half in thickness, and generally many feet apart: the interval between them is filled up with earth, making the whole appear like solid masonry. For six or seven feet from the ground these encasing walls are built of large square stones; the rest is of brick, paved on the top with flag-stones. The mortar used is of excellent quality. The wall itself averages about twenty feet in height, but the towers, which are distributed along it, are seldom less than forty feet high. At their base these towers are about fifteen feet square, but they gradually diminish as they ascend. Both walls and towers have battlements. There are stairs of brick and stone, as well as inclined-planes, to ascend to the platform on the top of the wall, along which six horsemen may ride abreast. Near all the gates may be found towns or large villages; indeed, near one of the gates which opens on the road towards India, there is a large and populous city, where two Catholic missionaries stayed thirty days. They state that "the esplanade on the top of the wall is much frequented by the citizens of Sining-fu, both for the enjoyment of the air, which blows most wholesomely and pleasantly from the adjacent deserts, and for the performance of sundry games and exercises for the easing and recreating of the mind; for the walls are of that height that they readily invite the inhabitants unto them by the prospect they afford, and which is on every side most clear and open, and withal exceeding pleasant: and the stairs that give ascent unto the walls are broad and convenient." They give the length of a journey which may be performed along the top of the wall, as occupying eighteen days, starting from the gate by Sining-fu, and stopping by the gate at the city of Sucien, which opens upon the desert; and state that many travellers, from motives of mere curiosity, having obtained permission from the governor of Sining-fu, and furnished themselves with provisions, have performed this mural journey. The contrast between the country within the walls and the wilds without, is described as being at certain points very striking; looking down from the battlements and towers which frequently fringed the loftiest rocks, these travellers could see on one side a cultivated expanse covered with numberless inhabitants, and on the other all the wildness of the desert, that seemed never to have been trod by human footsteps, but abounded with all kinds of wild beasts. The view of the wall itself must be equally imposing, as it traverses one vast plain after another, and strides over lofty mountains—its numerous towers, here entire and there falling to ruins, the sides of the walls, here free and open there overgrown with creeping plants, and garlanded with hardy trees that shoot from their interstices, or that spring from their base; the whole, to appearance, stretching out as if it were to girdle the globe, or as if it had no end. The antiquity of the structure must add to the vastness and solemnity of the impression.

Mr. Barrow makes some curious calculations, which assist the conception of the magnitude of this wonderful wall. According to him, the materials of all the dwelling-houses in England and Scotland, supposing them to amount to 1,800,000 (this was about half a century ago), and to average on the whole 2000 cubic feet of masonry or brickwork, are barely equivalent to the bulk or solid materials of the great wall of China! Nor are the projecting massy towers of stone and brick included in this calculation. These alone are calculated to contain as much material as London. The mass of matter is more than sufficient to surround the globe, on two of its great circles, with two walls, each six feet high and two feet thick! But in this calculation the earthy part in the middle of the wall is included.

In its eastern branch, it has only two gaps, and they are where an inaccessible mountain and broad rivers supply its deficiency. The passages through the wall are arched, or run underground. The sally-ports for the troops are very numerous. Purchase says, in his "Pilgrims," that "when any enemy appeareth, they kindle fires upon the towers, to give the people warning to come to their places where they are appointed upon the wall." Kircher, (a missionary,) says, "This work is so wondrous strong, that it is for the greatest part of admiration to this day; for through the many vicissitudes of the empire, changes of dynasties, batteries and assaults, not only of the enemy, but of violent tempests, deluges of rain, shaking winds and wearing weather, yet it discovers no signs of demolishment, nor is it cracked or crazed with age, but appears almost as in its first strength greatness, and beauty; and well it may be, for whose solidity whole mountains, by ripping up their rocky bowels for stones, were levelled, and vast deserts, buried with deep and swallowing sand, were swept clean to the firm ground."

This wall was probably begun as early as two centuries and a half before the commencement of our era; and it was finished according to Chinese authority, in five years, every third man in the empire, capable of such labour, being pressed into the service. When it is added that the greater number sunk under the pressure of such severe fatigue, the account is more credible; but the whole is no doubt much exaggerated. It is more probable that the whole of this stupendous undertaking was the work of several generations than of one prince.

THE CROWN OF EMPIRES AT AGRA.

The *Taj Mahal*, or Crown of Empires at Agra, is a mausoleum built by the Emperor Shah Jehan, in honour of his empress the Begum Narr Mahal. It is built of white marble, raised on a terrace, and in the form of a mosque, with minarets. The Mosaic ornaments of the interior, including even the marble pavement, are extensive, rich, and elaborate, the flowers and arabesques being composed of no less than twelve different stones, such as agates, jaspers, and various coloured marbles, the numerous quotations from the Koran being in black marble. A garden, with fountains and highly ornamented gateways, surrounds the mausoleum; and the *tout ensemble* is supposed, whether for extent, symmetry, material, or execution, *to surpass any thing in the world of the same description!*. This is the uniform opinion, even of those who have seen the master pieces of Italian art. "It is possible (says the celebrated Bernier) I may have imbibed an Indian taste; but I decidedly think that this monument deserves much more to be numbered among the wonders of the world than the Pyramids of Egypt." The architect was a Mahommedan, and the whole building is said to have cost £750,000.

The tomb of the emperor Acbar, six miles from Agra, is also a wonderful building, and would be so regarded in any place which had not the Taj Mahal to boast of. There are other mausoleums of astonishing size and grandeur. There is also the Mosque of Acbar, a building superior to the famous Mosque of Soliman at Constantinople. Its red granite walls are encrusted with plates of gold, and a cornice runs along the foundation. The Mosque of Aurengzebe, on the river side, is supported by upwards of one hundred columns. In addition to all these, Agra boasts of the Palace of Acbar, one of the finest buildings in Asia. It stands on an eminence; its walls of red granite present the appearance of a single block of stone, extending in a crescent shape along the river side, leaving between its walls and the water, a beach which is used as a harbour, where numerous trading vessels and pleasure-boats are continually calling. Three days in the week the great square of the palace, planted with several rows of oriental plane-trees is employed as a market-place. Round this square a fine gallery extends, and at regular distances are six triumphal arches of entrance, leading from the same number of spacious streets. The middle of the square is ornamented with a stone statue of an elephant emitting a stream of water from his trunk. The palace has two immense galleries, adorned with twenty-four double columns of white marble, with pedestals of blue granite, and capitals of yellow mica. The mosque connected with the palace is entirely of mica, and resembles a casket of precious pebble. In the interior of the apartments, sculptures executed in gold, marble, and red, yellow, and black stone, occur everywhere in the greatest profusion. Round the great palace, seven small marble palaces, for the use of the princes, are arranged in symmetrical order.

THE MOGUL PALACE AT LAHORE

Is one of the finest and most sumptuous in the world. It was founded by Acbar, and enlarged by his successors. When beheld from the opposite side of the river, with its varied terraced gardens, it looks like a scene of enchantment, suited to the ideas formed of the palace of Semiramis, or of one of the fairies of the Arabian Tales. The terraced roofs are adorned from one end to the other with a thousand species of the finest flowers native to a country which is the abode of eternal spring. The interior of this magnificent building is ornamented with gold, porphyry, and fine-grained red granite. The hall, where the throne is placed, and its gallery, are most of all admired, the walls and ceiling being covered with fine rock crystal, and a trellice of massive gold running along, adorned with figures of grapes, executed in pearls and precious stones, vying with one another in brilliance. The bathing-room contains a bath in the form of a boat, which is made of oriental agate, adorned with plates of gold, this used to be filled with eight hogsheads of rose-water! Across the river is a mausoleum of great beauty, only second to the Taj Mahal at Agra. "It is (says Burnes) a quadrangular building, with a minaret at each corner, rising to the height of seventy feet. It is built chiefly of marble and red stone, which are alternately interlaid in all parts of the building. The sepulchre is of most chaste workmanship, with its inscriptions and ornaments arranged in beautiful mosaic; the shading of some roses and other flowers is even preserved by the different colours of the stone. Two lines of black letters, on a ground of white marble, announce the name and title of the 'Conqueror of the World,' Jehangire; and about one hundred different words in Arabic and Persian, with a single signification of God, are distributed on different parts of the sepulchre. The floor of the building is also mosaic. It is probable that this beautiful monument will soon be washed into the Ravee, which is capricious in its course near Lahore, and has lately overwhelmed a portion of the garden wall that environs the tomb." The garden is another magnificent monument of Mogul grandeur. It has three terraces, each rising above the other. A canal brought from a great distance, intersects it, and throws up numerous fountains to cool the atmosphere.

THE JUMNA MUSJEED AT DELHI.

Is the largest and handsomest place of Mahommedan worship in India. It stands on a small rocky eminence scarped for the purpose. The ascent to it is by a flight of thirty-five stone steps, through a handsome gateway of red stone, the doors of which are covered with wrought brass. The terrace on which it is built is about 1400 yards square, and surrounded by an arched colonnade with octagon pavilions at convenient distances. In the centre is a large marble reservoir, supplied by machinery from the canal. On the west side is the mosque itself, an oblong form, 216 feet in length; its whole front coated with large slabs of white marble, and compartments in the cornice inlaid with Arabic inscriptions in black. It is approached by another flight of steps, and entered by three Gothic arches, each surmounted by a marble dome. At the flanks are two minarets 130 feet high, of black marble and red stone alternately, each having three projecting galleries, and their summits crowned with light pavilions of white marble, the ascent to which is by a winding staircase of 180 steps of red stone. But the finest building in Delhi, or even in the empire, is

THE IMPERIAL PALACE.

It is built of red granite, of a tasteful architecture, and is seen from a distance towering above the other buildings. Its length is 1000 yards, and its breath 600. It is said to have cost 10,500,000 rupees (£1,050,000). The rooms glitter with gilding, azure, and all sorts of ornaments. The stables are capable of holding 10,000 horses. Even the kitchens were like drawing-rooms. The palace of the princesses communicates with that of the emperor by a gallery. The walls of the great saloon are ornamented with crystal, and a lustre of black crystal of admirable workmanship hangs from the ceiling; so that when lighted up, the whole presents the appearance of a conflagration. Here was the "peacock throne." Legonx says, "it is of an oval form, placed under a palm-tree which overshadows it with its foliage: a peacock, perched on one of the large palm leaves, stretches its wings to cover the personage who is seated on the throne. The palm-tree and peacock are of gold. So thin and delicate are the feathers and the leaves, that they seem to wave and tremble with the slightest breath of wind. The tail and wings of the peacock glitter with superb emeralds. The fruit of the palm is partly executed in Golconda diamonds, and is an exact imitation of nature. "The Shalimar gardens (so highly extolled in 'Lalla Rookh') are said to have cost a million sterling! The prospect south of the gardens, far as the eye can reach, is covered with the ruined remains of magnificent gardens, pavilions, mosques, and sepulchres, exhibiting one of the most striking scenes of desolation anywhere to be met with. Towering upwards amid the ruins is the celebrated Cuttub Minar, considered by Bishop Heber the finest tower he ever saw. It rises in five stages, the three *lowest of which are of fine red granite, and the fourth of* white marble. It is 242 feet high.

INDIAN PAGODAS.

Among the wonderful buildings of India, the pagodas are pre-eminent. A few of them we shall now describe as specimens of a thousand others.

THE PAGODA OF SIDAMBURAM,

In the Carnatic, is esteemed a master-piece of architecture. It is encircled with a high wall of blue stone. Each of the three gates is surmounted with a pyramid 120 feet high, built with large stones above forty feet long and more than five square, all covered with plates of copper and adorned with a variety of figures neatly executed. The whole structure extends 1332 feet in one direction, and 936 in another. The circumference forms a vast gallery, divided into apartments, in which the Brahmins live. In the area of the temple there is a large pool, skirted on three of its sides with a beautiful gallery supported by columns. A broad stair of fine red granite leads down from each of these galleries to the pool. On the side opposite to the water there is a magnificent hall, ornamented with 999 columns of blue granite, covered with sculptures representing the principal Hindu deities. One of the greatest curiosities of this pagoda is an immense *granite chain* of exquisite workmanship, extending from four points of the circumference of the cupola to the nave, and forming four festoons 137 feet long, with the ends held by four enormous wedge-shaped stones belonging to the arch. Each link is somewhat more than three feet in length, and the whole of a beautiful resplendent polish.

THE PAGODA OF TANJORE,

Is reckoned the finest specimen in India of a pyramidical temple. Its grand tower is 199 feet in height, rising from the ground by twelve successive stages. In a covered area is a bull carved in black granite, sixteen feet in length by twelve and at half feet inheight, esteemed one of the best works of Hindu art.

THE PAGODA OF SERINGHAM,

An island opposite Trichinopoly, is pre-eminent in magnitude and sanctity, being about FOUR MILES IN CIRCUMFERENCE! There are seven successive inclosures or walls, twenty-five feet high and four feet thick, and 350 feet distant from each other. Some of the stones forming the columns of its gateways are thirty-three feet long, and five feet in diameter: those which form the roof are still larger. The innermost shrine has never been violated by any hostile power; nor has any European ever been admitted. It is visited by crowds of pilgrims and penitents from all parts of India. The priests and their families once formed a population of 40,000 souls, maintained by the offerings of superstition. "Here, as in all the other great pagodas of India (says a traveller), the Brahmins live in a subordination which knows no resistance, and slumber in a voluptuousness which knows no wants."

THE PAGODA OF MADURA,

Also, with its spacious areas, and four colossal porticos, each a pyramid of ten stories, covers an extent of ground almost sufficient for the site of a town!

THE TEMPLE OF THE GOLDEN SUPREME, IN BIRMAH,

Is the most famous building in the Birman empire. It boasts of high antiquity, and is raised on successive terraces in a manner similar to the religious structures of the Mexicans. It stands on an apparently artificial hill, the sides of which are sloped into two terraces, and ascended by steps of hewn stone. On the second terrace is the pagoda, a pyramidal building of brick and mortar, *without excavation or aperture of any sort!* It is octagonal at the base, each side measuring 162 feet, aud diminishing in breadth abruptly till it becomes of a spiral form. Its entire height from the ground is 360 feet. It is surrounded by two rows of small spires, a great variety of mouldings, ornaments in stucco, &c.; the whole being crowned with the *tee*, a sort of umbrella of open iron-work, gilt, fifty-six feet in circumference, surrounded by a number of small bells, and from the centre of which rises a rod with a gilded pennant. There are also smaller temples—miniatures of the large, at all the angles of the upper terrace—various saloons embellished with flowering and gilding, numerous sculptures, idols, flying pennants, bells, and dwellings for priests on the lower terrace. The erection of temples and images forms the grand operation to which the art and industry of the Birmans is directed. Major Symes considers the grand *Kioum*, or monastery, the residence of the head of the Birman church, as perhaps the most magnificent structure in the universe!

The East, and especially India, is indeed full of wonderful buildings and more wonderful ruins. To the latter we shall direct attention in the Part which follows this; and, in the meantime, we must describe some of the wonderful buildings in the West.

THE ESCURIAL OF TOLEDO.

THE grandest monument raised by the Spanish monarchs is the Escurial, or, more properly, the palace and monastery of San Lorenzo, near Madrid, and is regarded by the Spaniards as the eighth wonder of the world. But the title of palace belongs, in truth, more to the monastery than to that part of the building which is appropriated to the royal residence. It unites a regal costliness and design with religious gloom: it is an abode fit for a kingly monk, who wished to withdraw occasionally from the cares of the thrône into the solitude of the cloister. Such a king was the founder of this royal monastery, Philip the Second. In the plan, that of a pantheon was included, in pursuance of the will of the emperor Charles Fifth, in which his remains and those of the empress were deposited, in order that frequent masses might be said over their tombs for the repose of their souls. The edifice was begun in 1563 and finished in 1584. It stands in an elevated situation, between the declivities of two mountains, and forms a rectangular parallelogram, measuring from north to south 754 feet, and from east to west 580. Its elevation is in due proportion. It is so large that it looks, not a waste upon Olympus, but even grand amid the mighty buttresses of nature. The ashy pile looms like the palace of Death, who hence *sends forth his blasts of consumption*, which descend *from* these peeled Sierras to sweep human and vegetable life from the desert of Madrid. Cold as the grey eye and granite heart of its founder, this monument of fear and superstition would have been out of keeping, amid the flowers and sunshine of a happy valley.

It is built chiefly of granite. Its plan is an imitation of a *gridiron*, in reference to the torture suffered on that utensil by St. Lorenzo, the martyr, to whom it is dedicated. The royal residence forms the handle, and the feet are designated by the four towers in the corners of the edifice. In the principal front is the general entrance, and over the gate is a statue of St. Lorenzo, vested as a deacon, and holding a book in his left hand, and in his right a gridiron of gilt bronze. The whole building consists of three principal parts: the first comprehends the grand entrance, the square of the kings, and the temple; the second is the convent: and the third is appropriated to the palace and two colleges. On entering by the great gate, the visitor finds himself in the square of the kings, so called from six statues of scriptural kings which are in front of the temple. They are at least twice as large as life; and it is a curious circumstance, that the six statues, as well as that of St. Lorenzo, already mentioned, were cut out of the same block of stone. It is more curious still, that as much of the block still remains as would furnish materials for seven more statues equally large. Beneath these statues is the principal entrance to the temple. The interior is the triumph of architecture: it takes away the breath of the beholder from its majestic simplicity. The floor is formed of squares of white and grey marble, alternately arranged. The aspect of the great altar is extremely imposing. It is ascended by nineteen steps of red-veined jasper marble, which elevate it to a majestic height. The temple is decorated with forty paintings by different masters. The pantheon, where the royal remains are deposited, is a circular vault formed of jasper and other marbles of fine polish, filled with ornaments of gilt bronze. In the sides of the pantheon, to which but a very feeble light is admitted, are twenty-six niches, in which are deposited as many sepulchral urns of black marble, in which only kings and the mothers of kings are interred; for etiquette in Spain survives the grave. The other queens, together with the princes and princesses, are deposited in another vault, called the Pantheon of the Infantes. From the pantheon we pass to the library. The floor is of white and grey marble, and the ceiling is covered with paintings, corresponding to the nature of the place. In one compartment, Philosophy is showing the terraqueous globe to Socrates, Plato, Aristotle, and Seneca, all in colossal figures; and below the cornice is the school of Athens, divided into the two sects of stoics and academics. In another, Grammar, enthroned on clouds, surrounded by children with books and papers in their hands, presents to them a wreath of flowers to excite emulation. Beneath the cornice, the sons of Noah are seen building the Tower of Babel. In a third compartment, assigned to Rhetoric, Cicero is pleading for Rabirius, accused of treason, and the painting represents the emotions which his eloquence kindles in the hearts of the judges, and the liberation of the prisoner. Arithmetic, dialectics, music, geometry, astronomy, and theology, have each their separate compartments, and the *tout ensemble* is magnificent. Along the middle of the room are ranged seven tables, two of porphyry, and the other five of marble, which sustain spheres, terrestrial and celestial globes, according to different systems. The books are mostly bound in parchment. Upon their edges, which are all gilt, the titles are written; and for this reason they are placed with their edges outwards. The library is not extensive, but contains manuscripts, especially Arabic, that are of great value. The collection of paintings, it is probable yields only to that which covers the walls of the Vatican. The grand kitchen is worthy of 200 monks, who had little else to do but eat! From the kitchen to the royal residence the transition is easy, especially as it is placed in the handle of the gridiron. Here the catholic kings, whose life was one dull routine, spent six weeks every year, and thus became the real handle of the man of the cowl, who had access to the despot at his first rising and at his last folding of the arms to sleep. The gardens are among the finest in Spain. As everything is artificial the cost was enormous, reaching to forty-five million piastres: to form them, rocks were levelled and hollowed to admit pipes of fountain and roots of trees, whose soil was brought up from the plains. It requires to be constantly renewed, and even then the vegetation is dwarf-like; but despots delight in enriching favourites without merit, and their felicity contrasts with the people's misery.

THE WALHALLA.

THE Walhalla was, according to the ancient Scandinavian mythology, the celebrated temple of Odin, in which the demi-goddesses introduced to the gods all heroes who had fallen in battle from the beginning of the world. Walhalla was covered with shields; and 540 doors, each of which admitted at once 800 heroes, opened into it. In the centre stood a mighty tree, whose leaves were cropped by a goat, from whose udder flowed daily a vessel-full of mead, the only nourishment of the heroes in this paradise.

The Walhalla, however, which we are now about to describe, is the magnificent temple erected by Lewis, the present king of Bavaria, on the bank of the Danube. His Majesty thus speaks of it himself:—"It was in the days of Germany's deepest degradation, when there arose, in the beginning of the year 1807, in the mind of the Crown Prince, Lewis of Bavaria, the idea of having fifty likenesses of the most illustrious Germans executed in marble; and he commanded the undertaking to be commenced immediately. Afterwards the number was increased, limited only to distinguished Germans."

Walhalla is situated on a moderately steep eminence, overlooking a vast extent of country on the northern banks of the Danube, and opposite the ruins of the castle of Staufs. The ascent to the building is by a magnificent flight of more than 250 marble steps, divided by landing-places and terraces. At the foot of the second terrace is an entrance into the interior of the lower building, in which the arrangements for heating the hall now are, but which was intended for the Hall of Expectation, where the busts of the living were to have been placed until their death. This plan, however, was given up. The height of the *whole building* is very nearly 200 feet, the breadth of the *lowest wall* (which is of Cyclopean masonry, of polygonal blocks of dolomitic) 288 feet, and the length from north to south 438 feet, the terraces projecting 208 feet beyond the building. The height of the *hill* is 304 feet. The *temple* itself measures 330 feet in length, 108 feet in breadth, and 69 feet in height. The exterior is adorned by two pediments, with figures in high relief. The one refers, symbolically, to the restoration of Germany after the war against Napoleon. In the centre is seated Germania, on both sides of whom youthful warriors lead matrons (the different states of Germany) by the hand. The other represents the battle of Teutsberg, in which the Roman legions under Varus were destroyed by Herman. Augustus was so afflicted at this defeat, that he is said to have started from his sleep, exclaiming, "Restore me my legions, Varus!" The figure of Herman, ten feet high, is represented in the German dress, as recorded by Tacitus, trampling on the Roman eagle and fasces. On the right, two Roman warriors press forward to protect Varus, who is falling in despair on his sword; behind, a dying standard-bearer, by whose side a knight is kneeling, and trying to conceal his eagle in a morass—in this, another knight is sinking, and behind him a fallen ensign-bearer. Of the German figures on the left, the bard, with a tela, or species of harp, represents Poetry; the prophetess, Religion; the dying Sigmar, Herman's father; and Thusnedon, the conqueror's bride; are intended to point out the glory of a victorious death, and the dignified station which the women held among the ancient Germans. This work is one of the finest compositions of Schwanthaler, and is said to have occupied him ten years. The material from which both figures are hewn is the white marble of Sclandus in Tyrol.

The entrance is very fine. The gates are of gigantic dimensions, covered on the exterior with bronze, and on the interior with panels of maple. The length of the interior is 168 feet, the breadth 48 feet, and the height 53 feet.

The first pediment descending from the ceiling represents the *Creation*, according to the aboriginal mythology; the second, the period of completion; and the third, the contest with Destruction for the preservation of the universe. The walls are divided into six compartments on each side, in the lower of which are placed the busts of those inmates of Walhalla, of whom likenesses still exist: while the upper ones contain the names of those of whom no likenesses are to be found. The friezes also deserve notice. The first division over the entrance represents the immigration of the Germans into Germany, from the East and the Caucasus; the second, the religious, scientific, and artistical life of the ancient Germans and Druids; the third, their political life and their commerce. Then follow the chief contests of the Germans with the Roman Empire, concluding with the taking of Rome by Alaric, the Goth. Opposite to the entrance is represented the introduction of Christianity into Germany by St. Boniface, who is felling the sacred oak of heathenism. An inscription on the marble mosaic floor, states that this great undertaking was resolved on in 1807; begun Oct. 18, 1830; and concluded Oct. 18, 1832, the anniversary of the great battle of Leipsic.

THE CATHEDRAL OF ST. BASIL AT MOSCOW.

"One might imagine (says Dr. Clarke) that all the states of Europe and Asia had sent a building by way of representative to Moscow; timber huts from the regions beyond the Arctic; plastered palaces from Sweden and Denmark; painted walls from the Tyrol; mosques from Constantinople; Tartar temples from Bukhara; pagodas, pavilions, and verandahs from China; cabarets from Spain; dungeons, prisons, and public offices from France; architectural ruins from Rome; terraces and trellises from Naples; and warehouses from Wapping." But Moscow is gradually losing its Oriental appearance. In the great fire, in which the star of Napoleon set, the greater part of the city was consumed; but happily for the lover of antiquity, the Kremlin, which suffered comparatively little, retains unimpaired its ancient irregularity and grandeur.

Amongst the edifices which display the greatest singularity must be mentioned the Cathedral of St. Basil. It is the most extraordinary mass of buildings in Moscow, and, perhaps, in all Christendom. It consists of two stories, and is divided into twenty chapels, or small churches, which are connected with each other, but are of different styles of architecture and have different names. It is said that Divine service can be performed at the same time in them all, without one disturbing the other. The Czar was so enchanted with this idea, and the wonderful beauty of the building, that he deprived the architect of his eyesight, that he might not be able to raise another structure to rival the present one! No symmetry can be discovered in the different parts of this cathedral; the sixteen larger and smaller towers and cupolas differ from each other in form, and in the colour of their ornaments; and above them rises a profusely decorated pyramidical spire, with a bulb-shaped cupola, which, like the smaller ones, is surmounted with a cross upon a crescent. The following description, by the Marquis de Custine, may amuse the reader:—"Imagine a conglomeration of unequal small towers, composing together a bush—a nosegay of flowers; imagine rather, a species of irregular fruit, bristling with excrescences; or, better still, a crystallization of a thousand colours, whose polished metal reflects from far the rays of the sun, like Bohemian or Venetian glass, or the best varnished China emamel; there are scales of gilt fish, skins of serpents extended on heaps of shapeless stones, heads of dragons, lizards of varying hues, altar ornaments, sacerdotal dresses; the whole surmounted by spires, the painting of which resembles stuffs of shot-silk: in the narrow intervals of the belfries you see glittering roofs, painted in the glancing colours of pigeons' necks, rose-coloured or azure, and always highly varnished; the flashing of this *tapisserie* dazzles the eye, and fascinates the imagination."

THE SERAGLIO OF THE SULTAN.

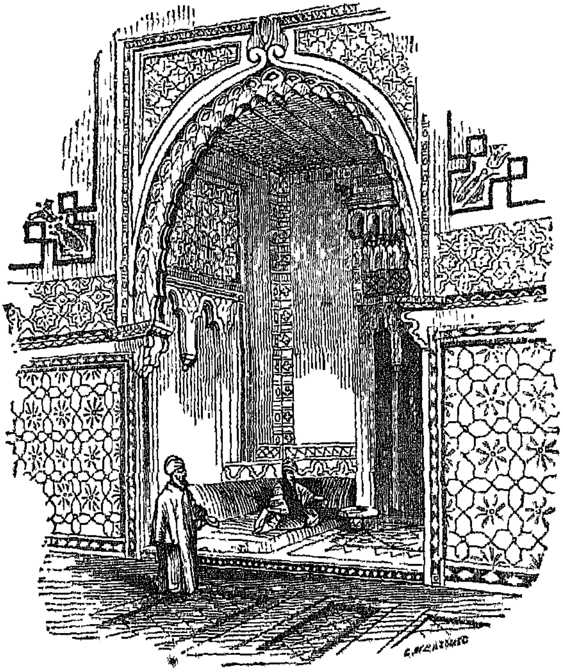
THE SERAGLIO occupies one of the seven hills on which Constantinople, like Rome, is erected. It is believed to be of the same extent as the ancient Byzantium, being about nine miles in circumference, and entirely surrounded with walls. Its whole surface is irregularly covered with detached suites of apartments, baths, mosques, kiosks, gardens, and groves of cypress. The palace consists of various parts built at different times, and according to the taste of successive sultans. Outside are two courts, the first of which is entered by the *Sublime Porte*, the principal of the gates on the city side—a ponderous structure covered with Arabic inscriptions, guarded by fifty porters, and having a niche on either side in front, in which the heads of state offenders are publicly exposed, That part of the building which is occupied by the females has been improperly called *Seraglio*, and hence the word has become synonymous with *Harem*, the Arabic word for temple, or sacred spot. Around the court runs a low gallery, covered with lead, and supported by columns of marble. At its further end is the tall Corinthian column, erected by Theodosius the Great, to commemorate his victory over the Goths. The throne-hall is built in great part of marble. The throne itself is a canopy of velvet fringed with jewels, supported by four columns covered with gold, pearls, and precious stones. The state apartments greatly resemble each other. The walls are wainscoted with jasper, mother-of-pearl, and veneered ivory, inlaid with mosaic flowers, landscapes, and sentences in Arabic. Baths of marble and porcelain, rich pavilions overlooking the sea, marble basins, and fountains, are sprinkled over the rest of the surface within the Seraglio. The number of inmates have been estimated at 10,000, all provided for by the Sultan. And Tournefort states, that when he visited the place, besides 40,000 oxen yearly, the purveyors furnished for the use of the Seraglio, daily 200 sheep, 100 lambs or goats, 10 calves, 200 hens, 200 pairs of pullets, 100 pairs of pigeons, and 50 green geese!

THE ALHAMBRA.

"THE Alhambra! O, immortal gods, what a palace is it! unique, I believe, upon the face of the whole earth!" Such was the exclamation of Peter Martyr, who entered it in the train of the Spanish conquerors.

The Alhambra (more properly, *Alhamra*) or the "Red City," was the Alcazar, or royal palace of the kings of Granada; but grew, by numerous additions, at last, "as it were, into another city." Some of the Arabian historians suppose it to have derived its name from the colour of its materials; others from Alhamar, the name of the founder's tribe. One of these historians thus describes its ancient appearance: "Here are seen lofty towers, very strongly-fortified citadels, superb palaces, and other splendid edifices, the view of which fills the spectator's mind with admiration. There a vast mass of water, whose loud murmuring noise is heard at a distance, flows from various springs, and irrigates both the fields and meadows. The outer walls of the city of Granada are surrounded by most choice and spacious gardens, where the trees are so thickly set as to resemble hedges; yet not so as to obstruct the view of the beautiful towers of the *Alhambra*, which sparkle like stars among the leaves."

Seated on the northern brow of a lofty eminence, which commands a full view of the city of Granada on the one side, and of a charming country on the other, the Alhambra yet encloses in its ruined walls many monuments of ancient art, and traces of its former splendour, which successfully rival, if they do not exceed in magnificence, all other remains of antiquity. It consists of two portions—the Arabian and Spanish—the latter of which was never finished, and is fast going to decay. The courts of the former were so contrived



ARABESQUE HALL, ALHAMBRA.

as to appear like a continuation of the series of apartments, and the whole being upon a perfect plane, the halls and galleries, and receding arches, with their fragrant furniture, could all be seen through the refreshing haze of the central fountains, which here first meet the eye. In its perfect state, it must have seemed like a scene of enchantment or a dream,—halls and galleries, porticos and columns, with plants and flowers of various hues, being visible in every direction through the spray of the fountains. In every part of the palace its inmates had water in abundance, with a perfect command over it; making it high or low, visible or invisible at pleasure. In some instances it spouted in the air, dispersing the floating miasmata, and tempering the aridity of the atmosphere; and in others, spreading out in the midst of the court in a large oblong sheet, reflecting the surrounding objects and the serene blue sky. In every apartment two currents of air were kept continually in motion, apertures being formed near the ceiling to discharge the warm and unwholesome air which the pure interior current forced upwards. Also by means of tubes of caked earth placed in the walls, warmth was diffused from subterraneous furnaces, not only through the whole range of the baths, but to all the contiguous upper apartments where warmth was required. The doors were large, but rather sparingly introduced; and, except on the side towards the precipice, where the prospect is very grand, the windows are so placed as to confine the view to the interior of the palace. The object of this is declared, in an inscription in one of the apartments, which says:—"My windows admit the light, but exclude the view of external objects, lest the beauties of nature should divert our attention from the beauties of my work." Bartlett says, "it was by haunting it on the moonlight nights that we fully realized all that is magical in this fairy palace—when its unsightly scars and patches are softened down,—when imagination might most freely revel, recalling the turbaned Moors and their antique states—when the play of the light and shade among these avenues of arabesque pillars was most fantastic and startling, the shadows of the halls most vast and sombre,—when the sleeping Albaycin, with its Moorish houses and courts below, was bathed in pale white light, and the outstretched vega and its mountain barrier dimly descried through the silvery haze of night." We next quote from the American author of the "Shores of the Mediterranean." "For summer luxury, and adaptation to the climate (he remarks) nothing could be more admirable. I have seen all the comfortable splendours of the royal private apartments in Windsor Castle, and remembering the date and the present difference of race, certainly the Moor of A.D. 1400 could match the British princes in all luxury; and when we recall the rich equipage and furniture of the Alhambra as it was 400 years ago, the precious woods of citron, sandal, aloes, and olive wood, ivory, and Mosaic of pearl; the gold and enamel work; the rich divans, the costly hangings, the curious works of art, and ingenious toys which abounded; the baths and plentiful luxuries; and the inhabitants of this sumptuous abode arrayed in fine linens and embroidered native silks, plumes, velvets, glittering with gems and wrought gold; and compare them with the British monarchs of that day, we shall have a striking contrast. At a still earlier period, when the palace floors of Windsor were strewed with rushes and straw, the richest carpets and ottomans were laid upon the superb marbles of the Alhambra. But there were other and far more interesting superiorities in the Moor; learning, literature, art, science, and accomplishments of every sort. Their national greatness attained its highest importance in the tenth century, when one of their kings accumulated a library of 600,000 volumes; eighty free-schools were established in Cordova, and the best scholars of Christian Europe flocked to the Moorish Colleges.

"Nothing in all antiquity surpassed their means of accomplishments and learning; and philosophers, poets, historians of the Arabs, grew great in numbers, and in fame. At this period the last Saxon king was on the throne of England, and ruled over a people described by Hume as uncultivated, unskilled in the mechanical arts, and untamed to submission, to law and government. While such was the state of England and of Europe, the single city of Cordova possessed 600 public temples, and the palace of the king was a great academy, to which students of all nations flocked, and the king himself partook of their learned conferences. At a later period, when Edward I. was on the throne of England, there were fifty colleges on the plain of Granada, and in Moorish Spain no less than seventy public libraries. The state of learning and literature at the same period in Christian Europe was yet in its dark period." The length of this quotation must not prevent us from following it up with another from Washington Irving, which sums up, in a few eloquent words, the prominent points in the history of this gallant but ill-fated race. It is regarded as one of the finest pieces of writing in that author's works.

"I fell into a course of musing upon the singular fortunes of the Arabian or Moresco-Spaniards, whose whole existence is as a tale that is told, and certainly forms one of the most anomalous, yet splendid episodes in history. A remote wave of the great Arabian inundation cast upon the shores of Europe, they seemed to have all the impetus of the first rush of the torrent. Their career of conquest, from the rock of Gibraltar to the cliffs of the Pyrenees, was as rapid and brilliant as the Moslem victories of Syria and Egypt; nay, had they not been checked on the plains of Tours, all France, all Europe, might have been overrun with the same facility as the empires of the East, and the Crescent might at this day have glittered on the fasces of Paris and of London. If the Moslem monuments in Spain, if the Mosque of Cordova, the Alcazar of Seville, and the Alhambra of Granada, still bear inscriptions fondly boasting of the permanency of their dominion, can the boast be derided as arrogant and vain? Generation after generation, century after century, had passed away, and still they maintained possession of the land. A period had elapsed, longer than that which has passed since England was subjugated by the Norman Conqueror, and the descendants of Musa and Taric might as little anticipate being driven into exile across the same straits traversed by their triumphant ancestors, as the descendants of Rollo and William, and their veteran peers, may dream of being driven to the shores of Normandy. Never was the annihilation of a people more complete than that of the Moresco-Spaniards. Where are they? Ask the shores of Barbary and its desert places. The exiled remnant of their once powerful empire disappeared among the barbarians of Africa, and ceased to be a nation. They have not even left a distinct name behind them, though for nearly eight centuries they were a distinct people. A few broken monuments are all that remain to bear witness to their power and dominion, as solitary rocks, left far in the interior, bear testimony to the extent of some vast inundation. Such is the Alhambra, a Moslem pile in the midst of a Christian land; an oriental palace amidst the gothic edifices of the west; an elegant memento of a brave, intelligent, and graceful people, who conquered, ruled, and passed away."

THE WONDERS OF THEBES.

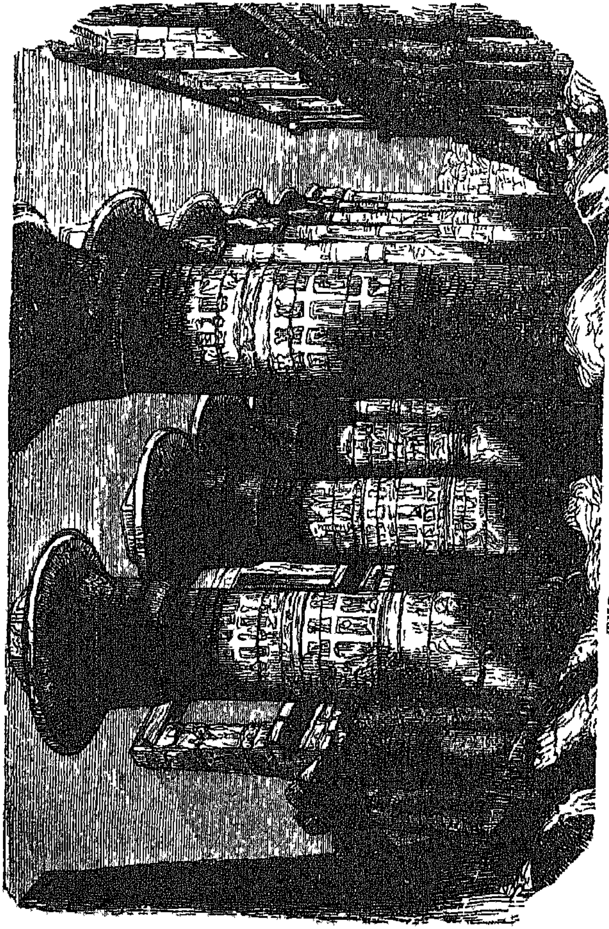
For "Wonderful Ruins" we return at once to Egypt, and in Egypt to *Thebes*,—the City of the Hundred Gates,—that mighty capital, the foundation of which is unknown to history, and belongs only to the dim ages of traditionary poetry, whose report would have been rejected as fabulous, had not such mighty monuments survived to prove that it fell short of the reality. This work of the first age of the world almost eclipses, as to grandeur, all that art and power have since produced. The ancient city was twenty-three miles in circumference. The valley of the Nile was not large enough to contain it, and its extremities rested upon the bases of the mountains of Arabia and Africa. At first the observer sees only a confusion of portals, obelisks, and columns, all of gigantic size, towering above the palm-trees. Gradually he is able to distinguish, on the Eastern or Arabian side, the palaces of Karnac and Luxor; on the Western or Lybian side, Madinet Abu, the Memnonium, and the tombs cut in the mountain behind. There they are standing in the unwatered sands in solitude and silence. They are neither grey nor blackened; there is no lichen, no moss, no rank grass or mantling ivy, to robe them and conceal their deformities. Like the bones of man, they seem to whiten under the sands of the desert. The sand has blown upon them for more than 3000 years, and has buried the largest monuments, and, in some instances, almost entire temples.

THE PALACE-TEMPLE OF KARNAC

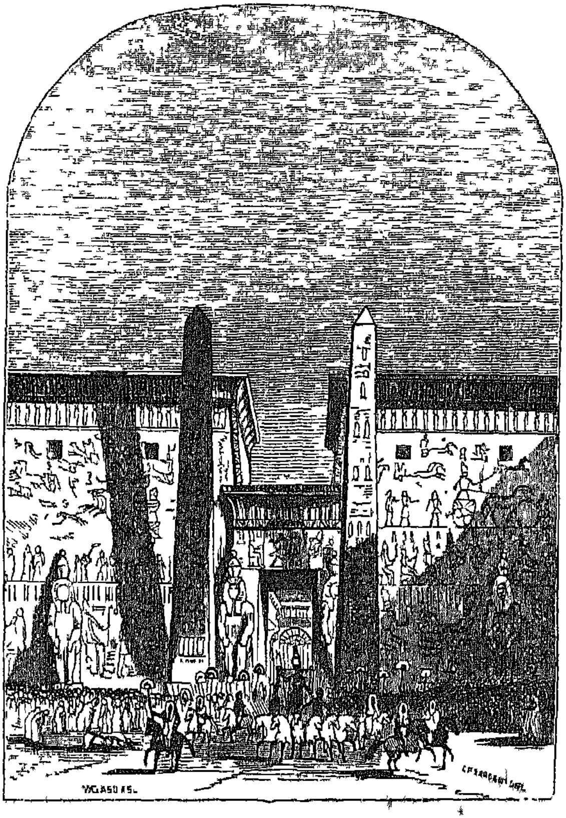
Surpasses in grandeur every other structure in Thebes, and in the world. The old Pharaohs brought their gods into their palaces, and also had apartments in the temples; so that the great buildings of this metropolis were appropriated to gods and kings jointly. The French engineers on horseback were an hour and a half in performing its circuit, which, they therefore conceive, cannot be less than three miles. The temple itself is 1200 feet long and 420 feet broad! On the north-east entrance the Egyptians appear to have lavished all their magnificence. The approach is by a long avenue of

RUINED EGYPTIAN PORTICO.

sphynxes, the largest of any in Egypt, leading to a succession of portals with colossal statues in front. These structures are distinguished, not only by the grandeur of their dimensions, but by the variety of the materials. A calcareous stone, compact as marble, a variegated silicious limestone, beautiful rose-coloured and black marbles of Syene, have been severally used. Most points of view present only the image of a general overthrow, rendering it difficult to distinguish Karnac as a series of regular edifices. Across these vast ruins appear only fragments of architecture; trunks of broken columns; mutilated colossal statues; obelisks—some fallen—others majestically erect; immense halls, whose roofs are supported by a *forest of columns, portals, and propylea, surpassing* in magnitude all similar structures. From the west, this chaos assumes an orderly appearance; and the almost endless series of portals, gates, and halls, appear ranged in regular succession, and harmonising with each other. When the plan is thoroughly understood, its symmetry appears wonderful; and the highest admiration is excited by the arrangement and symmetry of all the parts of this vast edifice. Not only the *general extent*, but all the particular features, of this extraordinary structure are distinguished by a magnitude elsewhere *unparalleled*. There are two obelisks of sixty-nine feet, and one of ninety-one feet, high: this, the loftiest of any in Egypt, is adorned with sculptures of perfect execution. The principal Hall is 318 feet long and 159 broad, having the roof still supported by 134 columns. These are about seventy feet high, and eleven feet in diameter; and a long avenue of others have all, except one, fallen down entire, and lie on the ground, still ranged in their primitive order. All the sculptures are adorned with colours, which, though most liable, it might be supposed, to suffer from the ravages of time, shine still with the brightest lustre. Of the large sphynxes fifty are still remaining, and there are traces which show that the whole avenue once contained 600. The palace itself is entered with great difficulty, and its interior, being dark and filled with rubbish, presents few objects to attract the attention; but on reaching the roof, the spectator enjoys a distinct and most magnificent view of the whole range of surrounding ruins. All who have visited this scene describe the impression made by it as almost superior to that caused by any other earthly object. According to Denon, the whole French army, on coming in sight, stood still, struck as it were with an electric shock. The scene appears to be rather the produce of an imagination surrounding itself



THE GREAT HALL OF KARNAC.



LUXOR (RESTORED).

with images of fantastic grandeur, than anything belonging to real existence. Belzoni declares that the most sublime ideas which can be formed from the most magnificent specimens of our present architecture, would give a very inadequate picture of these ruins. It appeared to him that he was entering a city of departed giants. He seemed alone in the midst of all that was most sacred in the world. The forest of enormous columns, adorned all round with beautiful figures and various ornaments: the high portals seen at a distance from the openings to this vast labyrinth of edifices; the various groups of ruins in the other temples; these, altogether, had such an effect upon his mind, as to separate him in imagination from the rest of mortals. For some time he seemed unconscious whether he was on terrestrial ground, or on some other planet. If, however, Karnac is unrivalled in the *grandeur and extent* of its remains,

THE TEMPLE OF LUXOR,

As a *single and beautiful object*, seems superior to anything else in Egypt. The view from the river is peculiarly beautiful, when, across the verdant islands with which it is studded, appears a wide plain covered with palm-trees, over which these colossal masses throw their shadows; while, behind, the Arabian mountain-chain forms the boundary of the landscape. The approach is through the village of Luxor, whose crowded and miserable huts form a strange contrast with these monuments of ancient splendour. At length the portico appears, by the sides of which stood the two most beautiful obelisks in the world, each rising to the height of eighty feet, yet composed of a *single block* of the finest granite, from the quarries of Syene. By what means such colossal masses were conveyed to so great a distance, and placed in their present position, surpasses the conception of modern art. Behind them are two colossal statues, now studiously defaced, and deep sunk in the sand, but which must have been forty feet high, and composed of a single block of the same granite. The propylon is 200 feet in height, rising fifty-seven feet above the present level of the soil. The stones of this outwork alone would build a cathedral. The interior is equally grand. It presents to the view upwards of 200 columns of different dimensions, many of them 10 feet in diameter, and most in an entire state. But nothing is more remarkable in this edifice than the profusion of sculptures with which the obelisks, the walls, and all the apartments, are covered. These, indeed, are favourite ornaments on all the Egyptian edifices, and remarkably frequent in the palace of Karnac; but they occur here in unexampled profusion, and executed with as much care and delicacy as if they had been the work of the most skilful seal-engraver. They appear to represent the history and triumphs of an ancient Egyptian sovereign, probably the founder of the edifice. One compartment, in particular, exhibits a great battle in which the Egyptians, armed with bows and arrows, gain a complete victory over their Asiatic enemies, armed with the spear and javelin. The forms of pursuit and retreat, the attitudes of the victors, the wounded, and the dying, are so varied and striking, that it is supposed to have furnished Homer with materials for many of the varied descriptions with which his narrative is filled.

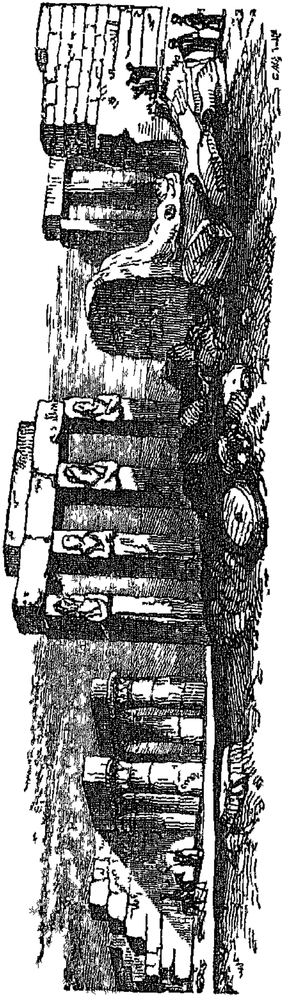
The Western or Lybian side of the Nile presents monuments of the grandeur of Thebes, which, though not of the same stupendous magnitude, are perhaps equally interesting. The Memnonium, and the Temple of Medinet Abu present, though on a smaller scale, architecture and painted sculpture of the same character; equally excellent, and in many cases still better preserved. This is particularly observable in regard to the brilliancy of the gold, ultramarine, and other colours.

THE MEMNONIUM

Is distinguished by three colossal statues, one of which is within the edifice, and the two others are in the plain adjoining. The former is entirely broken into fragments, which, being dispersed through the court, cover a space of sixty feet square, giving it *the resemblance of a quarry!* The form of the head, however, may still be traced, though the face is entirely mutilated A foot and a hand have been found among the fragments, the ear is three feet long; the distance from shoulder to shoulder is twenty-two feet; and the entire height of the statue appears to have been about fifty feet. It was composed of a single block, which must have weighed two millions of pounds. The two statues placed on the plain are still standing, but mutilated to such a degree that it is impossible to judge of the merits of the sculpture. One of them, from the numerous inscriptions, appears evidently to have been the vocal statue of Memnon, celebrated by the ancients as emitting a musical sound at sunrise or when struck at particular times of the day. No modern visitor, however, has been able to elicit more than the usual sound made by percussion upon granite; and there seems no doubt that the musical tones were produced by some contrivance of the Egyptian priests.

THE TOMBS OF THEBES

Remain to be noticed. The rocks behind conceal in their excavated bosom these monuments, less vast, indeed, than those now described; but of a still more striking and peculiar character. In all the Oriental countries peculiar honours are



THEBES.

PATHROS.

paid to the dead; but no nation appears to have equalled the Egyptian in monumental works. Wherever the remains of a city have been investigated, the mountains behind have been found excavated into sculptured tombs; and those of Thebes, as might be expected, surpass all the others in number, extent, and splendour. The Lybian chain, which presents for about six miles a perpendicular height of 300 or 400 feet of limestone rock, has appeared peculiarly suited for such elaborate sepulchres. These subterranean works of the Egyptians almost rival the monuments which they raised on the surface of the earth. Entrance galleries lead into large apartments, in which are placed the sarcophagi, and which are profusely decorated with that species of coloured sculpture with which they lavishly ornamented their walls. The deceased lies surrounded with representations of all the objects which formed his pride and occupation while living. A complete picture is thus exhibited of the domestic life of the ancient Egyptians; and many of the customs there indicated are still characteristic of the people. They took the most jealous care to prevent any one from penetrating into these tombs. The entrances were closed with the greatest care by large stones, so united with the neighbouring rock as to prevent, if possible, any suspicion that they existed. Belzoni gives a very lively description of the difficulties attending the examination of these tombs and of the mummies which they contain. "You must creep through narrow passages, sometimes not more than a foot wide, after which you come to a more commodious place, perhaps high enough to sit. But what a place of rest! Surrounded by bodies, by heaps of mummies in all directions. After the exertion of entering into such a place, through a passage of 50, 100, 300, or perhaps 600 yards, I sought a resting-place, found one, and contrived to sit; but when my weight bore on the body of an Egyptian, it crushed it like a band-box. I naturally had recourse to my hands to sustain my weight, but they found no better support; so that I sank altogether among the broken mummies, with a crash of bones, rags, and wooden cases, which raised such a dust as kept me motionless for a quarter of an hour, waiting till it subsided again." These *private* tombs, however, are far surpassed by *the tombs of the kings*. At a temple called El Ebek, a narrow gorge or ravine leads by a winding track into the heart of the Lybian mountains. At the end of two miles, a narrow chasm between rocks opens into "the Valley of the Tombs," a gloomy solitude, presenting the arid and desolate aspect of the most frightful desert.

High mountains with rocky summits bound the horizon on all sides, and allow only part of the sky to appear. In this awful solitude, the ancient Egyptians sought to seclude from every human eye the magnificent monuments of the kings of Thebes. Avarice and curiosity, however, have triumphed over every precaution. All had been done to secure the entrance. The huge mass of stone, which bars it, opens, when penetrated, into a narrow and intricate passage, closed by successive gate after gate. At length entrance is found into spacious chambers, in the middle of which is the sarcophagus, commonly empty, while the walls are adorned with painted sculpture, in the highest style of Egyptian magnificence. Their high preservation is the more remarkable, as they are in general executed not on the solid rock, which is here too hard to be susceptible of such ornaments, but on a soft plaster or stucco, which, however, has preserved them unaltered during several thousand years.

But these are not half of the ruins of Thebes. Volumes have been written upon them, and volumes may yet be written; and he who reads all will still have but an imperfect idea of the Wonders of Thebes.

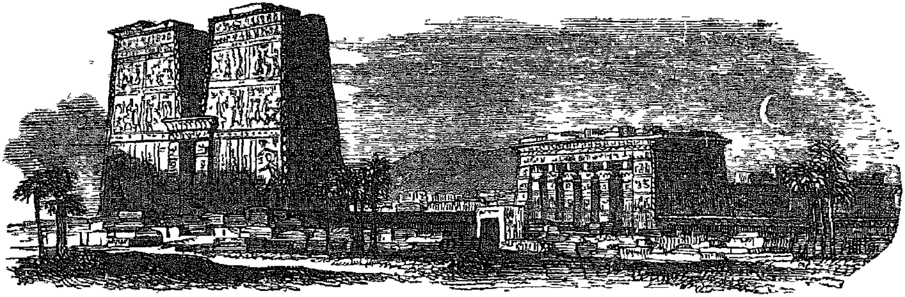
EDFOU.

Further up the Nile, towards the extremity of habitable Egypt is found another monument, which for the happy conception of the plan, the majesty of the composition, the execution and richness of the ornaments, may be compared to whatever is most magnificent in architecture. *It is the best preserved of all the Egyptian temples of the same dimensions.* We have, for this reason, got a drawing of it prepared, in aid, or rather in lieu of our description; for we must now pass on to the other wonderful ruins which lie scattered, not over Egypt only, but over the world. The temple at Edfou is 484 feet in length, 212 in breadth.

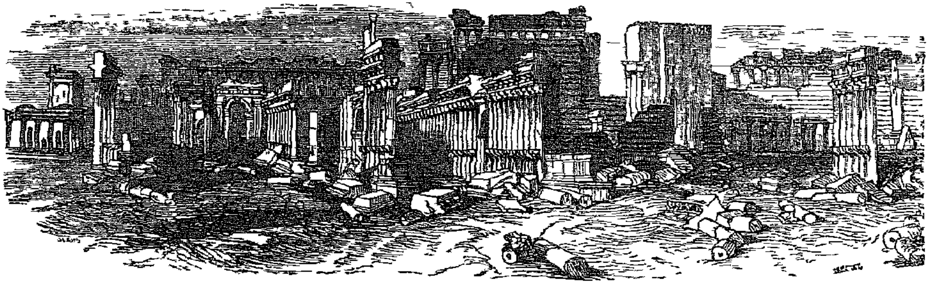
Still passing up the Nile, we come into Nubian territory, and find temples so similar to the Egyptian as to lead to the conjecture that civilization and the arts *descended* the Nile from Ethiopia to Memphis. At Kalabshe there is a temple, the propylon of which is 120 feet long, and fifty feet high. At Gyrshe there is an excavated temple, the entrance to which is adorned with large columns, and three colossal statues, eighteen feet high, the workmanship of which appeared to Belzoni to display the mere infancy of the art. The figures are such as barely to indicate that men are meant to be represented, and their faces are caricatures of that of the negro. The grandest monument of Nubia is *Ibsambul,* whose excavated chambers rival the proudest boasts of Thebes. This temple is cut out of the solid rock, rising perpendicularly about 600 feet from the Nile. The entrance, however, when first visited by Burckhardt was choked up with sand; but Belzoni, by unexampled exertion and perseverance, succeeded in clearing away the obstacles, and found the interior truly magnificent. Hieroglyphics, painted sculptures, colossal statues, and all the ornaments which characterize Egyptian temples, are profusedly employed. Battles, storming of castles, triumphs, particularly over the Ethiopians, with captive groups of that race, are the subjects chiefly represented. The exterior of the temple is 117 feet wide, and eighty-six feet high; but the most remarkable feature consists of four colossi, which, with the exception of the Sphynx, are the largest sculptured figures in Egypt or Nubia. Burckhardt, who saw only the shoulder of one of them above the sand, conjectured, from its dimensions, that the whole would be sixty-five or seventy feet. Belzoni, after removing the sand, found it fifty-one feet, not including the cap which was fourteen feet, so accurate was Burckhardt's conjecture. Some days' sail further up, majestic ruins are to be found scattered along the bank, among which pre-eminent beauty is displayed by *the temple of Soleb.* The remains consist only of a range of solitary columns; but these are of such peculiar lightness and elegance, that they may come into competition with any along the whole course of the river.

PALMYRA.

"As patience is the greatest of friends to the unfortunate, so is Time the greatest of friends to the lovers of landscape. It resolves the noblest works of art into the most affecting ornaments of created things. The fall of empires, with which the death of great characters is so immediately associated, possesses a proscriptive title, as it were, to all our sympathy, forming at once a magnificent, yet melancholy spectacle; and awakening in the mind all the grandeur of solitude. Who would not be delighted to make a pilgrimage to the East to see the columns of Persepolis, and the still more magnificent ruins of Palmyra? Where awe springs, as it were personified, from the fragments, and proclaims instructive lessons from the vicissitudes of fortune. Palmyra, once a paradise in the centre of inhospitable deserts, the pride of



EDFOU



PALMYRA.

Solomon, the capital of Zenobia, and the wonder and admiration of all the East, now lies 'majestic though in ruins!' Its glory withered, time has cast over it a sacred grandeur, softened into grace. History by its silence, mourns its melancholy destiny, while immense masses and stupendous columns denote the spot, where once the splendid city of the desert reared her proud and matchless towers."* The astonishment that takes hold of the mind at the strange position of this magnificent city, at one time the capital of the East, on the edge of the Great Desert, and surrounded, for several days' journey, on all sides by naked solitary wilds, is removed by marking well the peculiarity of its geographical position. The great caravans coming to Europe laden with the rich merchandize of India, would naturally come along the Persian gulf, through the south of Persia, to the Euphrates, the direct line; their object then would be to strike across the great Syrian Desert as early as possible, to reach the large markets and ports of Syria. With more than 600 miles of desert without water, between the mouth of the Euphrates and Syria, they would naturally be obliged to keep along the banks of that river, until the extent of desert country became diminished. They would then find the copious springs of Tadmor the nearest and most convenient to make for. These springs would then become very important, and would naturally attract the attention of a wise prince like Solomon, who would "fence them with strong walls." Here the caravans would rest and take in water; here would congregate the merchants from adjacent countries and from Europe; and from hence the great caravan would be divided into numerous branches, to the north, south, and west. A large mart for the exchange of commodities would be established and an important city would quickly arise. The choice of this spot by Solomon we may naturally consider founded on a policy of enriching himself by drawing the commerce of India through his dominions, from which commerce, probably he derived the wealth for which he is so celebrated. But Palmyra is as celebrated for its last monarch as for its first founder. It is the city of Solomon. It is also the city of Zenobia. All that is known of the origin of this celebrated woman is, that she was descended from the Ptolemies of Egypt, and that she boasted of having Cleopatra for an ancestress. Her beauty and enterprise all have heard of. Her complexion was a dark brown; she had black sparkling eyes, of uncommon fire; her countenance was divinely animated; her person graceful; her teeth white as pearls, and her voice clear and strong. If you add to this an uncommon strength, and consider her excessive military fatigues (for she used no carriage, generally rode, and often marched on foot three or four miles with her army); and if you, at the same time, suppose her haranguing her troops, which she used to do in her helmet, and often with her arms bare, you have a figure of masculine beauty which combines in one the divinest glories of Minerva and Venus. "Her manly understanding (says Gibbon) was strengthened and adorned by study. She was not ignorant of the Latin tongue, but possessed, in equal perfection, the Greek, the Syriac, and the Egyptian languages. She had drawn up for her own use, an epitome of Oriental history, and familiarly compared the beauties of Homer and Plato, under the tuition of the sublime Longinus." This heroine conquered Syria and Mesopotamia, subdued Egypt, and added the greater part of Asia Minor to her dominions. At last she was herself subdued by all-conquering Rome.

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* Harmonies of Nature.

The first view of the ruins is described by all travellers as extremely magnificent. "When (says Bruce) we arrived at the top of the hill, there opened before us the most astonishing, stupendous sight that, perhaps, ever was presented to mortal eyes. The whole plain below, which was very extensive, was covered so thick with magnificent ruins, that the one seemed to touch the other; all of fine proportions, all of agreeable forms, all composed of white stone, which, at that distance, appeared like marble." At the end of the sandy plain, the eye rests upon the lofty columns of the Temple of the Sun; and beyond—all around—and right and left towards the Euphrates, as far as the eye can reach, extends the vast naked level flat of the Great Desert, over which the eye runs in every direction, piercing the boundless horizon, without discovering a human being. Naked, solitary, unlimited space extends around, where man never breathes under the shade, or rests his limbs under the cover of a dwelling. A deep blue tint spreads along its surface, here and there shaded with a cast of brown. There is something grand and awe-inspiring in its boundless immensity. Like the first view of the ocean, it inspires emotions never before experienced, unearthly in appearance, and out of character with the general face of nature.* "I have stood (says an American) before the Parthenon, and have almost worshipped that divine achievement of the immortal Phidias. I have been at Milan, at Ephesus, at Alexandria, at Antioch; but in none of these renowned cities have I beheld anything that I can allow to approach, in united extent, grandeur, and most consummate beauty, this almost more than work of man. On each side of this, the central point, there rose upward slender pyramids—pointed obelisks—domes of the most graceful proportions, columns, arches, and lofty towers—for number and for form, beyond my power to describe. These buildings, as well as the walls of the city, being all either of white marble, or of some stone as white; and, being everywhere interspersed with multitudes of overshadowing palm-trees, perfectly filled and satisfied my sense of beauty, and made me feel, for the moment, as if in such a scene I should love to dwell, and there end my days."

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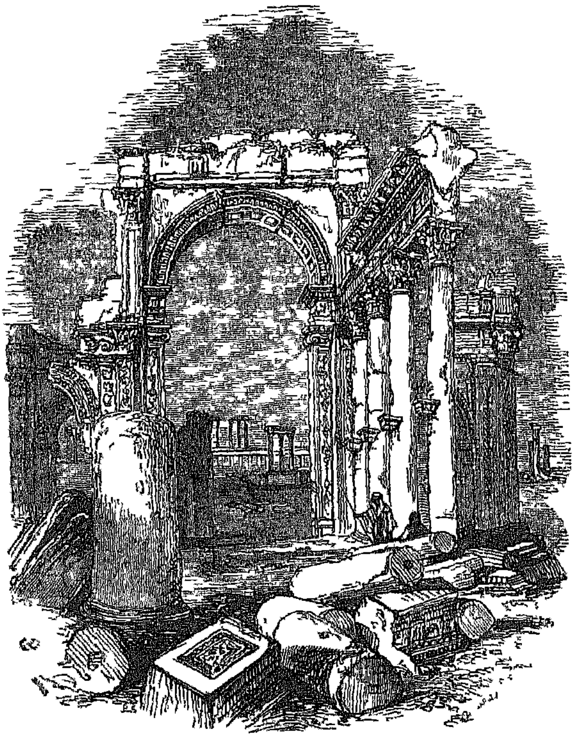
* Addison.

THE TEMPLE OF THE SUN

Is by far the most extensive ruin in Palmyra. The grand entrance (see engraving, page 53,) was supported by four fluted Ionic pillars, and adorned with rich carvings of vine leaves and clusters of grapes, in bold and spirited relief, beautifully chiselled. Within the court are the remains of two rows of very noble marble pillars, 37 feet high. The temple was encompassed with another row of pillars, 50 feet high. On the eastern side of the area of the temple, there is a curious doorway of one solid block of stone, which commands a fine view of the desert. "As we looked out of this narrow gateway (says Addison), we fancied that Zenobia herself might have often stood at the same spot, anxiously surveying the *operations* of Aurelian and his blockading army. From hence the eye wanders over the level waste, across which the unfortunate queen fled on her swift dromedary to the Euphrates; and here, the morning after her departure, doubtless, congregated her anxious friends, to see if she was pursued in her flight; and from hence she was probably first descried, being brought back a captive and a prisoner, in the hands of the Roman horsemen."

Next to the temple, the most remarkable structure is the long portico, which extends for nearly 4000 feet. There is also a piazza 40 feet broad, and more than half a mile in length, inclosed with two rows of marble pillars 26 feet high, and eight or nine feet in compass. Of these there still remain 129; and, by a moderate computation, there could not originally have been less than 560. A little to the left, are the



GATE OF THE SUN.

ruins of a stately building, which appears to have been a banquetting-house. It is built of better marble, and is finished with greater elegance than the piazza. The pillars that supported it were entire stones. One of them which has fallen down has received no injury! It measures 22 feet in length, and in compass, eight feet nine inches. "We sometimes find a palace (says Volney) of which nothing remains but the courts and walls; sometimes a temple, whose peristyle is half thrown down, and now a portico, a gallery, or a triumphant arch. Here stand groups of columns, whose symmetry is destroyed by the fall of many of them; these we see ranged in rows of such length, that, similar to rows of trees, they deceive the sight, and assume the appearance of continued walls. On which side soever we look, the earth is strewed with vast stones, half buried, with broken entablatures, damaged capitals, mutilated friezes, disfigured reliefs, effaced sculptures, violated tombs, and altars defiled with mud."

Lo! where PALMYRA, 'mid her wasted plains,
Her scattered aqueducts, and prostrate fanes,
As the bright orb of breezy midnight pours,
Long threads of silver through her gaping towers,
O'er mould'ring tombs, and tott'ring columns gleams,
And frosts her desert with diffusive beams,
Sad o'er the mighty wreck in silence bends,
Lifts her wet eyes, her tremulous hand extends.*

PETRA.

PETRA, the excavated city, the long lost capital of Edom signifies a *rock;* and through the shadows of its early history we learn that its inhabitants lived in the "clefts of the rock." Desolate as it now is, we have reason to believe that it goes back to the time of Esau, "the father of Edom;" and we recognize it, from the earliest ages, as the central point to which came the caravans from the interior of Arabia, Persia, and India, laden with all the precious commodities of the East, and from which those commodities were distributed through Egypt, Palestine, and Syria, and all the countries bordering on the Mediterranean. Eight hundred years before Christ, Amaziah, the king of Judah, "slew of Edom in the Valley of Salt 10,000, and took Salah" (the Hebrew name of Petra.) In the beginning of the second century, though its independence was lost, Petra was still the capital of a Roman province. After that time it rapidly declined; its history became more and more obscure; for more than a thousand years its existence was completely lost to the civilized world; and until its discovery by Burckhardt in 1812, except to the wandering Bedouins, its very site was unknown. This ancient and extraordinary city is situated within a natural amphitheatre of two or three miles in circumference, encompassed on all sides by rugged mountains 500 or 600 feet in height. The whole area is now a waste of ruins, dwelling-houses, palaces, and triumphal arches, being all prostrate together in indistinguishable confusion. The sides of the mountain are cut smooth, in a perpendicular direction, and filled with long and continued ranges of dwelling houses, temples, and tombs, excavated with vast labour out of the solid rock; and whilst their summits present Nature in her wildest and most savage form, their bases are adorned with all the beauty of architecture and art, with columns, and porticos, and pediments, and ranges of corridors, enduring as the mountains out of which they are hewn, and fresh as if the work of yesterday. Nothing can be finer than the immense rocky rampart which encloses the city. Strong, firm, and immovable as Nature itself, it seems to deride the walls of cities, and the puny fortifications of skilful engineers. The only access is by clambering over this wall of stone, practicable only in one place, or by an entrance the most extraordinary that Nature, in her wildest freaks, has ever framed. The loftiest portals ever raised by the hands of man, the proudest monuments of architectural skill and daring, sink into insignificance by the comparison. It is impossible to conceive any thing more awful and sublime than the Eastern approach to Petra. For about two miles it lies between high and precipitous ranges of rocks from 500 to 1000 feet in height, standing as if torn asunder by some great convulsion, and barely wide enough for two horsemen to pass abreast. A swelling stream rushes between them; the summits are wild and broken; in some places overhanging the opposite sides, casting the darkness of night upon the narrow defile; then receding and forming an opening above, through which a strong ray of light is thrown down, and illuminates with the blaze of day the frightful chasm below. Wild fig-trees, oleanders, and ivy, are growing out of the rocky sides of the cliffs hundreds of feet upward; the eagle is screaming overhead; all along are the open doors of tombs, forming the great Necropolis of the city; and at the extreme end is a large open space, with a powerful body of light thrown down upon it, and exhibiting in one full view the façade of a beautiful temple, hewn out of the rock, with rows of Corinthian columns and ornaments standing out fresh and clear as if newly from the hands of the sculptor.

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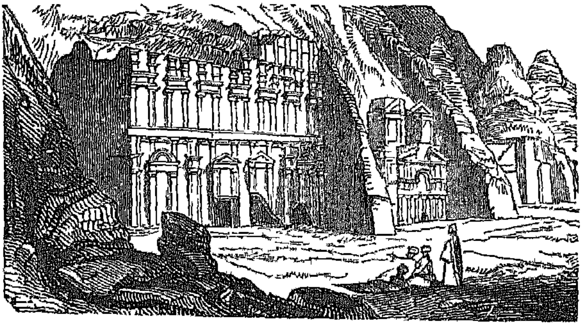
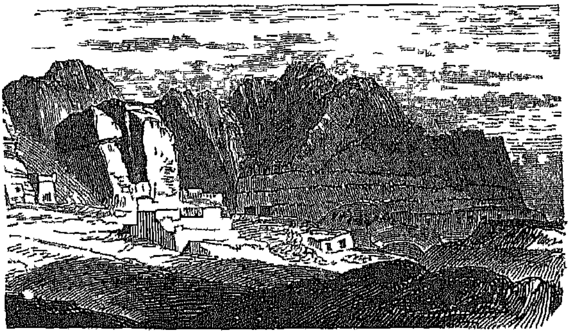
* Darwin.

"Though coming (says Mr. Stephens) directly from the banks of the Nile, where the preservation of the temples excites the admiration and astonishment of every traveller, we were roused and excited by the extraordinary beauty and excellent condition of the great temple at Petra. Even now that I have returned to the pursuit and thought-engrossing incidents of a life in the busiest city in the world, I see before me the façade of that temple; neither the Coliseum at Rome, grand and interesting as it is, nor the ruins of the Acropolis at Athens, nor the Pyramids, nor the mighty temples of the Nile, are so often present to my memory." The whole temple, its columns, ornaments, porticos, and porches, are cut out from, and form part of, the solid rock; and this rock, at the foot of which the temple stands like a mere point, towers several hundred feet above, its face cut smooth to the very summit, and the top remaining wild and misshapen as Nature made it. The whole area before the temple is perhaps an acre in extent, enclosed on all sides except at the narrow entrance, and an opening to the left of the temple, which leads into the area of the city by a pass through perpendicular rocks, 500 or 600 feet in height.



RUINS OF PETRA.

Leaving the temple, and following the stream, we enter another defile much broader than the first, on each side of which are ranges of tombs, with sculptured doors and columns; and on the left, in the bosom of the mountain, hewn out of the solid rock, is a large theatre, circular in form, the pillars in front fallen, and containing thirty-three rows of seats, capable of containing more than 3000 persons. Above the corridor is a range of doors, opening to chambers in the rocks, the seats of the princes and aristocracy of Petra, and not unlike a row of private boxes in a modern theatre! The whole is at this day in such a state of preservation, that if the tenants of the tombs around could once more rise into life, they might take their old places on its seats, and listen to the declamation of their favourite player. To me the stillness of a ruined city is nowhere so impressive as when sitting on the steps of its theatre; once thronged with the gay and pleasure-seeking, but now given up to solitude and desolation. Day after day, these seats had been filled; and the now silent rocks had echoed to the applauding shout of thousands! Where are ye now, inhabitants of this desolate city? Ye who once sat on the seats of this theatre, the young, the high-born, the beautiful and brave? Where are ye now? Even the very tombs, whose open doors are stretching away in long ranges before the eyes of the wondering traveller, cannot reveal the mystery of your doom: your dry-bones are gone; the robber has invaded your graves, and your very ashes have



RUINS OF PETRA.

been swept away to make room for the wandering Arab of the desert." Every deserted place is mournful enough;—a grass-grown farm-house in Ireland; a city buried under mounds in Egypt; but nowhere else is there desolation like that of Petra, where these rock door-ways stand wide,—still fit for the habitation of a multitude,—but all empty and silent, except for the multiplied echo of the cry of the eagle, or the bleat of the kid. In the morning the sons of Esau were wont to come out in the first sunshine to worship at their doors, before going forth, proud as their neighbour eagles, to the chase; and at night, the yellow fires lighted up from within, tier above tier, the face of the precipice. But it was said of old, "Edom shall be a desolation; every one that goeth by it shall be astonished;" and so is it now!

POMPEII.

"THE inhabitants (says a French writer) were asleep, when suddenly an impetuous wind arose, and detaching a portion of the cinders which covered the summit of Vesuvius, hurried them in whirlwinds through the air, and within a quarter of an hour entirely overwhelmed Herculaneum, Sorento, Pompeii, and the elder Pliny! Imprudent men! Why did you build Pompeii at the foot of Vesuvius, on its lava, and on its ashes? The *roofs of the city* became fields and orchards; and one day, while the peasants were digging, something was found to resist. It was a city! It was Pompeii!"

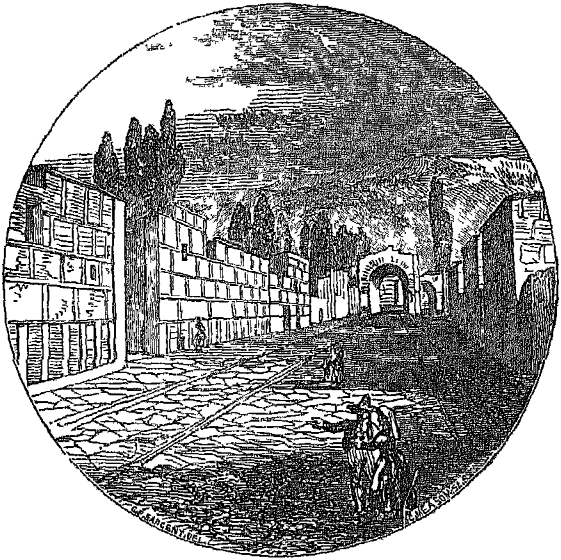
The first indications of its site were observed so early as 1689, but it was not till 1755 that any effectual attempts were made to explore its remains. Few works are more exciting than this disinterment of a buried city. The upper stories of the houses, which appear to have consisted chiefly of wood, were either burned by the red-hot stones ejected from Vesuvius, or broken down by the weight of matter collected on their roofs and floors. With this exception, we see a flourishing city in the very state in which it existed nearly eighteen centuries ago; the buildings as they were originally designed; the paintings undimmed by the leaden torch of Time; household furniture left in the confusion of use; articles, even of intrinsic value, abandoned in the hurry of escape; and, in some instances, the bones of the inhabitants, bearing sad testimony to the suddenness and completeness of the calamity which overwhelmed them.

One interesting instance of this suddenness is thus pointed out: "I noticed a striking memorial of this mighty interruption in the Forum, opposite to the Temple of Jupiter. A new altar of white marble, exquisitely beautiful, and apparently just out of the hands of the sculptor, had been erected there; an enclosure was building all round; the mortar, just dashed against the side of the wall, was but half spread out; you saw the long sliding stroke of the trowel about to return and obliterate its own track—but it never did return: the hand of the workman was suddenly arrested; and after the lapse of eighteen hundred years, the whole looks so fresh and new, that you would almost swear the mason was only gone to his dinner, and about to come back immediately to smooth the roughness."

Pompeii was not completely buried by a single eruption. Eight successive layers have been traced above its ruins. In the intervals the inhabitants must have returned to secure their more valuable property. Sir William Gell mentions that a skeleton of a Pompeian was found, "who apparently for the sake of sixty coins, a small plate, and a saucepan of silver, had remained in his house till the street was already half filled with volcanic matter." The position of the skeleton indicated that he had perished apparently in the act of escaping from his window. Other incidents of like character are no less striking. The skeletons of the Roman sentries were found, in more than one instance, *at their posts*, furnishing a remarkable proof of the stern military discipline of imperial Rome. The skeleton of a priest was found in one of the rooms of the Temple of Isis. Near his remains lay an axe, with which he had been trying to break through the door.

"The ruins of Pompeii (says Mr. Eustace) possess a secret power, that captivates and melts the soul! In other times, and in other places, one single edifice, a temple, a theatre, a tomb, that had escaped the wreck of ages, would have enchanted us; nay, an arch, the remnant of a wall, even one solitary column, was beheld with veneration; but to discover a single ancient house, the abode of a Roman in his privacy, the scene of his domestic hours, was an object of fond, but hopeless longing. Here, not a temple, nor a theatre, nor a house, but a whole city rises before us, untouched, unaltered —the very same as it was 1800 years ago, when inhabited by Romans. We range through the same street, tread the very same pavement; behold the same walls; enter the same doors; and repose in the same apartments. We are surrounded by the same objects; and out of the same windows we contemplate the same scenery. In the midst of all this, not a voice is heard to disturb the loneliness of the place. Perhaps the whole world does not exhibit so awful a spectacle as Pompeii; and when it was first discovered, when skeletons were found heaped together in the streets and houses, when all the utensils, and even the very bread of the poor suffocated inhabitants were discernible, what a spectacle must this ill-fated city have furnished to a thinking mind! To visit it even now is absolutely to live with the ancient Romans; and when we see houses, shops, furniture, fountains, streets, carriages, and implements of husbandry, exactly similar to those of the present day, we are apt to conclude, that customs and manners have undergone but little alteration for the last 2000 years."

"I entered, (says Dupaty) several of the rooms, and found in one of them a mill, with which the soldiers ground their corn for bread; in another an oil-mill, in which they crushed the olives. The first resembles our coffee-mills; the second is formed of two mill-stones, which were moved by the hand, in a vast mortar, round an iron centre. In another of these rooms I saw chains still fastened to the leg of a criminal; in a second, heaps of human bones; and in a third, a golden necklace. What is become of all the inhabitants? We see nobody in the streets! All the houses are open! Let us begin by visiting the houses on the right. This is not a private house; that prodigious number of surgical instruments, shows that it must have been a surgery. These houses are very small; they are exceedingly ill-contrived; all the apartments are detached; but then what neatness, what elegance! In each of them is an inner portico, a mosaic pavement, a square colonnade, and in the middle a cistern, to collect the water falling from the roof. In each of them are hot-baths, and stoves, and everywhere paintings in fresco, in



STREET IN POMPEII.

the best taste, and on the most pleasing grounds. Has Raffaelle been here to copy his arabesques? Suppose we take a step into this temple for a moment, since it is left open. What deity do I perceive in the bottom of that niche? It is the god of Silence, who makes a sign with his finger to command silence, and points to the goddess Isis, in the further recess of the sanctuary. In the front of the porch there are three altars. Here the victims were slaughtered, and the blood, flowing along this gutter into the middle of that basin, fell from thence upon the heads of the priests. This little chamber, near the altar, was undoubtedly the sacristy. The priests purified themselves in this bathing-place. Here is a monument erected to the memory of those who have been benefactors to Isis, that is to say, to her priests. I cannot be far from the country-house of Aufidius; for there are the gates of the city. Here is the tomb of the family of Diomedes. Let us rest a moment under these porticos, where the philosophers used to sit. I am not mistaken. The country-house of Aufidius is charming; the paintings in fresco are delicious. What an excellent effect have those blue grounds! with what propriety, and consequently with what taste are the figures distributed in the panels! Flora herself has woven that garland. But who has painted this Venus? this Adonis? this youthful Narcissus, in that bath? And here again, this charming Mercury? It is surely not a week since they were painted. I like this portico round the garden; and this square covered cellar round the portico. Do these amphoræ contain the true Falernian? How many consulates has this wine been kept? But it is late. It was about this time the play began. Let us go to the covered theatre; it is shut.—Let us go to the uncovered theatre; that too is shut. I know not how far I have succeeded in this attempt to give you an idea of Pompeii."

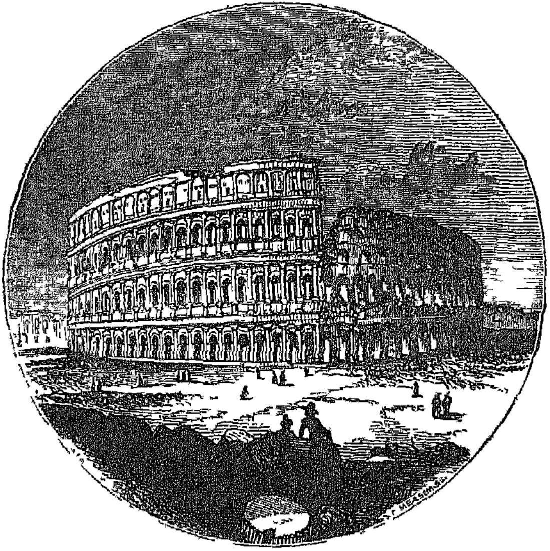
Excellently, we think!

THE COLISEUM.

The far-famed amphitheatre of Vespasian, or, as it is more generally called, the Coliseum,

> "Which, in its public days, unpeopled Rome,
> And held uncrowded nations in its womb."

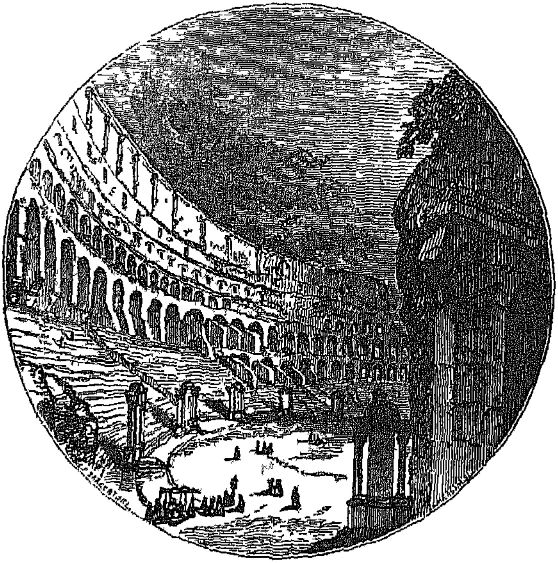
is one of the most massive works ever raised in Rome, or in the world. In whatever way it is viewed, whether as regards its immense size, the solidity of its structure, the simplicity and harmony of its architecture, the grace and beauty of its proportion, or its internal arrangement and convenience, it equally strikes the mind with wonder and admiration. Placed at some distance from the gorgeous churches, extensive palaces, and busy streets of modern Rome, it stands alone in solitary dignity and gloomy contrast; elevating its stupendous masses from above the surrounding ruins of the imperial city; a striking image of Rome itself in its present state, erect on the one side, and fallen on the other; half grey, half green, deserted and decaying; a splendid and melancholy monument of past greatness: and no monument of human power, no memorial of departed ages, ever spoke more forcibly to the heart, or awakened feelings so powerful and unutterable. The Coliseum was commenced in the year 72, by Fla-



EXTERIOR OF THE COLISEUM.

vius Vespasian, as a triumphant memorial of his victories in Judea. Twelve thousand Jewish prisoners, reduced to slavery, were employed on the work, which was finished by Titus, who, on its dedication, exhibited shows and games for 100 days!

It is impossible to say at what period it was first suffered to decay. So late as 1632, bull-fights, and other games, were exhibited in it. By sanction of the Popes it was used as a quarry, so that



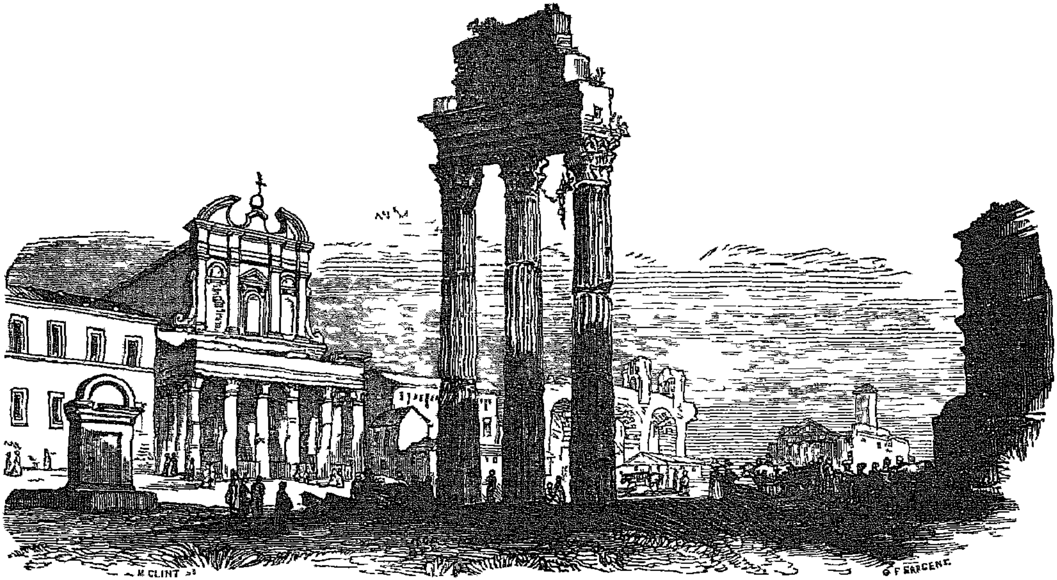
INTERIOR OF THE COLISEUM.

"From its mass,
Walls, palaces, half-cities, have been rear'd."

Still, after a lapse of nearly eighteen centuries, having frequently suffered from earthquakes, storms, and fire; having been several times battered as a fortress, during the civil contentions of the middle ages; it remains a miracle of human labour, and is, even in its present state, the most wonderful monument of Roman magnificence. Solitary and desolate, it is still grand and imposing; the rich hues with which time has overspread its venerable fragments, the luxuriant clusters of vegetation, and the graceful drapery of numerous beautiful creepers, festooning the rifled arches, and broken arcades, whilst assimilating with the general character, add an indescribable richness and variety to the whole, that has a powerful effect on the mind of the spectator.

When it was entire, a child might comprehend its design in a moment, and go direct to his place without straying in the porticos. The shape was oval, lined round with seats and galleries, sloping down toward the arena, which occupies the centre. The outward circumference when complete was about 1772 feet, covering a surface of about 246,660 feet, or something more than five acres and a half. When some pilgrims mentioned by Bede, beheld it, they are said to have exclaimed: "As long as the Coliseum stands, Rome shall stand; when the Coliseum falls, Rome will fall; and when Rome falls the world will fall."

"I wandered long around it (says Dupaty) without venturing to enter it: my eyes surveyed it with admiration and awe. At length I entered within its precincts. What an astonishing scene! There was it then that gladiators, martyrs, and slaves, who combatted on the Roman festivals, only to make the blood circulate a little quicker in the veins of a hundred thousand idle spectators. I thought I still heard the roaring of the lions, the sighs of the dying, and, what would strike my ears with still greater horror, the applauses of the Romans. But what a change has taken place in this arena! In the middle stands a crucifix, and round it fourteen altars, consecrated to different saints. It was thus Benedict XIV, conceived the idea of saving this noble monument by consecrating it. I walked through every part of the Coliseum; I ascended into all its different stories; and sat down in the box of the emperors. I shall long remember the silence and solitude that reigned through these galleries, along these ranges of seats, under these vaulted porticos. I stopped from time to time to listen to the echoes of my feet in walking. What pleasure did I not enjoy, too, in observing how the day gradually retired, and the night as gradually advanced over the arcades, spreading her lengthening shadows. At length I was obliged to retire; with my mind, however, filled with a thousand ideas—a thousand sensations,



THE FORUM

which can only arise among these ruins, and which these ruins in some degree inspire."—Another ruin of intense historical interest in Rome is

THE FORUM.

It was once,
And long the centre of their universe,
The Forum—whence a mandate, eagle winged,
Went to the ends of the earth. Let us descend
Slowly. At every step much may be lost.
The very dust we tread stirs as with life;
And not a breath but from the ground sends up
Something of human grandeur.
We are come:—
And now where once the mightiest spirits met
In terrible conflict; this, while Rome was free,
The noblest theatre on this side heaven. *

The Forum was an entirely open space; it had public buildings in it, as well as around it. Among them were the Temple of the Penates, the Temple of Concord, the Temple of Jupiter Stator, the Temple of Castor and Pollux, the Temple of Pollux, the Temple of Vesta, the Temple of Victory, the Temple of Julius Cæsar, and the arches of Fabian, Tiberius, and Severus. All these, however, and in most cases, even the traces of them, have disappeared.

Now all is changed! and here, as in the wild,
The day is silent, weary as the night;
None stirring, save the herdsman and his herd,
Savage alike; or they that would explore,
Discuss and learnedly; or they that come
(And there are many who have crossed the earth)
That they may give the hours to meditation,
And wander, often saying to themselves,
'This was the Roman Forum.'

The glories of the Forum are now fled for ever. Its temples are fallen; its sanctuaries are crumbled into dust; its colonnades encumber pavements, now buried under their remains. The walls of the rostra, stripped of their ornaments, a few shattered porticos, and here and there an insulated column standing in the midst of broken shafts, vast fragments of marble capitals and cornices heaped together in masses, are all that remain of its former greatness and grandeur. It is reduced, indeed, not to the pasture-ground for cattle, which Virgil has described, but to the market-place for pigs, sheep, and oxen,—being now the Smithfield of Rome

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* Rogers.

The hills, the rivers, the roads, the bridges in this mother of cities, mostly go by their ancient Latin names, slightly altered in Italian, but the Forum has not even retained its name: it is now called Campo Vaccino, or the Field of Cows!

This scene, though now so desolate and degraded, was once the great centre of all the business, power, and splendour of Rome. Here, as long as the Romans were a free people, all the affairs of the state were debated in the most public manner; and from the rostra, elevated in the midst of the square, and with their eyes fixed on the Capitol, which immediately faced them, and which tended to inspire them with patriotism, whilst the Tarpeian rock reminded them of the fate reserved for treason and corruption; the noblest of orators "wielded at will" the fierce democracy, or filled the souls of gathered thousands with one object, one wish, one passion—the glory of Rome!

> Yes; in yon field below,
> A thousand years of silenced factions sleep—
> The Forum, where the immortal accents glow,
> And still the eloquent air breathes, burns of Cicero!

THE VATICAN,

OR, THE PALACE OF THE POPES.

Early in the decline of the empire, the Christian bishops established their residence on the Mons Vaticanus. Of the ancient condition of this episcopal palace, little or nothing is known. It was inhabited for a short time by Charlemagne; and a long succession of popes enlarged and adorned it with the wealth poured into the pontifical coffers by all Christendom, until it became at length in many respects the most extraordinary edifice inhabited by man. It is said to cover a space about 1200 feet in length by 1000 in breadth, and to comprise above 4000 apartments. If placed in a continuous line, its suite of galleries would extend two miles in length! It contains a countless multitude of inscriptions, statues, busts, urns, and vases, to say nothing of its literary treasures. It is the richest museum in Europe, and its treasures are magnificently lodged. The library contains about 80,000 printed books, and 35,000 MSS.; but, in point of fact, its literary riches are unknown, the catalogues having never been completed.

You enter by a large doorway in the colonnade of St. Peter's, and come immediately upon a magnificent flight of steps which branches off to the right and left, conducting to different suites of apartments. To enhance the grandeur of this staircase, the natural laws of perspective have been artificially interfered with, so that the eye imagines itself to be traversing an immense distance, though the real space it commands be comparatively limited. In the Sistine Chapel is Michael Angelo's famous picture of the "Last Judgment," which covers 900 square feet, and took the artist eight years to execute. On the left of the choir stands the pope's throne, and on the right the benches for the cardinals, above which is the musicians' gallery. Here during the performance of the 'Miserere,' are heard some of the finest singing and music in Italy. On such occasions the chapel is densely crowded, and a red light is cast over the sea of heads by numerous flambeaux. The multitude is hushed; and then instruments and voices, mingling together, roll intoxicating floods of sound over the excited worshippers. In the arcades, known by the name of Raphael's Loggie, the genius of the greatest of modern artists has displayed all his prolific powers of creation. Tier above tier the pictures rise to the ceiling, displaying the utmost perfection of form and colour.

The series of domes of which the roof consists, is painted with architectural ornaments, trellis-work covered with lines relieved against a light-blue sky, and filled here and there with birds of Oriental plumage in the gayest hues of summer. No language can convey an idea of the blaze of colours and variety of forms which meet the eye in the innumerable frescos. The Corridor of Inscriptions, containing sarcophagi, statues, pedestals, and pagan altars, is a single apartment 993 feet in length! Parallel with this runs another corridor of equal length. The corridor of the Library is connected with that of Inscriptions by a magnificent apartment about 180 feet in length by 51 feet in breadth. The painted ceiling terminates in a cornice of white and gold, extending round the whole room. In the spaces between the pillars is a profusion of vases and candelabra, with a curious column of Oriental alabaster. The books are locked up. In the vestibule at the end of the Library is a finely-preserved specimen of the asbestos winding-sheet, in which the bodies of the dead used to be consumed on the funeral pile. This cloth, which is incombustible, preserved the ashes of the body from mingling with those of the pile itself. We shall not attempt to take the reader through the different parts of the building. Galleries, corridors, halls, courts, vestibules, and suites of apartments, follow in interminable succession, till the eye and the imagination droop from sheer satiety. Had the Vatican been built from a regular design, or on any intelligible plan, it would have seemed less wonderful in appearance, for the mind, in that case, could have more easily grasped the whole. As it is, it appears like one of the enchanted palaces of the East, in which you might wander for ever without emerging from the labyrinth. You mount, you descend, you turn to the right, you turn to the left, and everywhere you find yourself in a blaze of grandeur. Taken altogether, it ought to suggest to its occupiers ideas of humanity and of profound veneration for human genius, which has created that universe of beauty and grandeur by which they are surrounded. One of the appendages, however, of the Vatican is the Inquisition, which suggests that the splendour of the one was based on the wickedness of the other. The description of St. Peter's will be given elsewhere.

PÆSTUM.

"If (says Dr. Clarke) there be upon earth any buildings, which may be fairly brought into a comparison with the Parthenon, they are the temples of Pæstum." "It is impossible (says Dupaty) to visit the place without emotion. I proceed across desert fields, along a frightful road, far from all human traces, at the foot of rugged mountains, on shores where there is nothing but the sea; and suddenly I behold a temple, then a second, then a third: I make my way through grass and weeds; I mount on the socle of a column, or on the ruins of a pediment: a cloud of ravens take their flight; cows are lowing in the bottom of a sanctuary; the adder, basking between the column and the weeds, hisses, and makes his escape; a young shepherd, however, carelessly leaning on an ancient cornice, stands serenading with his reedy pipe the vast silence of this desert." Pæstum was a Grecian colony in Italy; and the ruins are supposed to exhibit the oldest specimens of Greek architecture now in existence. "In beholding them, (says Eustace) and contemplating their solidity, bordering upon heaviness, we are tempted to consider them as an intermediate link between the Egyptian and Grecian monuments; and the first attempt to pass from the immense masses of the former to the graceful proportions of the latter." Taking these wonderful objects into view, their immemorial antiquity, their astonishing preservation, their grandeur, their bold columnar elevation, at once massive and open, their severe simplicity of design,—that simplicity in which art gradually begins, and to which, after a thousand revolutions of ornament it again returns,—taking (says Mr. Forsyth) all into one view, "I do not hesitate to call these the most impressive monuments I ever beheld on earth."

Majestic fanes of deities unknown!
Ages have roll'd since here ye stood—alone;—
Since your walls echoed to the sacred choir,
Or blazed your altars sacrificial fire.
And now—the wandering classic pilgrim sees
The wild bird nestling in the sculptured frieze
Each fluted shaft by desert weeds embraced,
Triglyphs obscured, entablatures defaced;
Sees ill-timed verdure clothe each awful pile,
While Nature lends her melancholy smile;
And misplaced garniture of flowers that shed
Their sweets, as if in mockery of the dead.*

RUINS OF ATHENS.

THE PARTHENON.

"At first sight (says one traveller) it rather disappointed my expectations, and appeared less than its fame. The eye, however, soon became filled with the magnitude of its dimensions, the beauty of its materials, the exquisite perfection of its symmetry, and the harmonious analogy of its proportions. It is the most unrivalled triumph of sculpture and architecture that the world ever saw. The delight which it inspires on a superficial view is heightened in proportion as it is attentively surveyed. If we admire the whole of the gorgeous fabric, that admiration will be augmented by a minute investigation of all the ramified details. Every part has been finished with such exquisite taste, that not the smallest instance of negligence can be discovered in the execution of those particulars which are the least exposed to observation; the most concealed minutiæ of the structure having been perfected with a sort of pious scrupulosity." Another traveller, the famous Lamartine, says: "I pass delicious hours recumbent beneath the shade of the Propylæa; my eyes fixed on the falling pediment of the Parthenon. Its aspect displays better than history the colossal grandeur of a people. Pericles ought not to die. What superhuman civilization was that which supplied a great man to command, an architect to conceive, a sculptor to decorate, statuaries to execute, workmen to cut, a people to pay, and eyes to comprehend and admire such an edifice! Let us, in idea, rebuild the Parthenon; it is easily done—it has only lost its frieze, and its internal compartments. The external walls, chiselled by Phidias, the columns, and fragments of columns remain. The Parthenon was entirely built of Pentalic marble, so called from the neighbouring mountain of that name whence it was taken. It consists of a parallelogram, surrounded by a peristyle of forty-six Doric columns, each column is six feet diameter at the base, and thirty-four feet high. The columns are placed on the pavement of the temple itself, and have no bases. At each extremity of the temple there is a portico of six columns. The total length of the edifice is 228 feet, its width 200 feet, its height 66 feet. It only presents to the eye the majestic simplicity of its architectural lines. It was, in fact, one single idea expressed in stone, and intelligible at a glance like the thoughts of the ancients."

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*Rogers.

"The Parthenon (says Plutarch) was constructed with such admirable judgment, such solidity of workmanship, and such a profound knowledge of the architectural art, that it would have indefinitely defied the ravages of time, if they had not been assisted by the operations of external violence. It is an edifice that seems to have been constructed for eternity. The structures which Pericles raised are the more admirable, as being completed in so short a time, they yet had such a lasting beauty; for, as they had, when new, the venerable aspect of antiquity, so, now they are old, they have the freshness of a modern work. They seem to be preserved from the injuries of time by a kind of vital principle, which produces a vigour that cannot be impaired, and a bloom that will never fade." These words of Plutarch were applicable to the Parthenon till little more than a century ago, and would still have been so if it had not found enemies in the bigotry of contending religionists, in war, and the robberies of artists and amateurs. The high preservation of those parts which are still suffered to remain is truly astonishing. The columns are so little broken, that were it not for the venerable reality of age, they would almost appear of recent construction. The western front is rich in golden hues, and seems as if it had absorbed the evening beams. Little white appears, but the brightest orange colour, and grey, and sulphury hues, combine in sweetest harmony. The noble shafts of the huge columns are uniformly lined with yellow, of a brownish cast, admitting here and there a little grey.

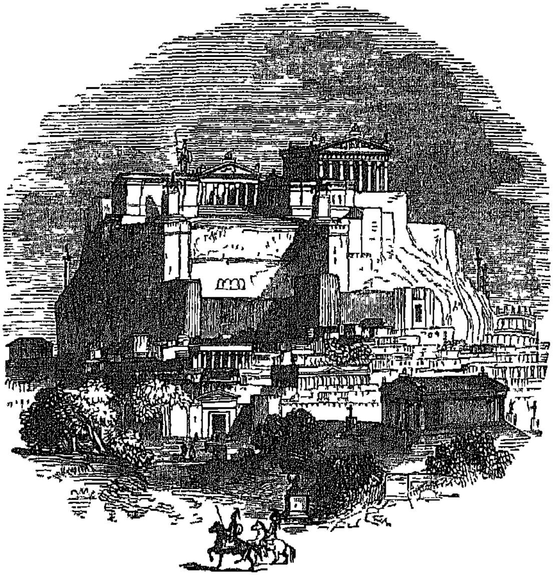
The multitude of grand objects in Athens and its Acropolis, is too great for our limits to allow us to enter into more than a mere enumeration. Among the foremost may be named a range of sixteen superb columns, believed to be the remains of 116 which belonged to the *Temple of Olympian Jove.* In 1676 there were seventeen, but a few years before Chandler's visit, the pacha had, with incredible labour, levelled one to the ground, for the purpose of raising a mosque out of the materials! The others are still standing, sixty feet high, and about six feet in diameter, a splendid specimen of the Corinthian order, and built of the very finest marble. The *Temple of Theseus* somewhat resembles the Parthenon, and is perhaps, as to its general outline, the most entire of all the Grecian edifices. There are other structures of less magnitude, the *Propylæa*, or columnar entrance of the Acropolis; the *Lantern of Demosthenes*, the marble *Tower of the Winds*, &c. Besides the edifices of Athens, there are some spots which the visitor cannot contemplate without emotion. Among them is

THE ACROPOLIS.

THE old city of Athens was situated on the top of a rock in the midst of a pleasant plain, and as the inhabitants increased, became full of buildings, and gave birth to a new city—the one called the *Acropolis* or upper, and the other the *Catopolis* or lower city. They were thus related to each other like the old and new town of Edinburgh. The flat space on the rock of the Acropolis is not more than 800 feet in length, and about 400 feet in breadth, (smaller than the site of some of the Egyptian temples), but containing not a single structure which might not be denominated a masterpiece of art. "In its pride and glory (says Chandler), it appeared as one entire offering to the Deity, surpassing in excellence, and astonishing in richness." "To a person who has seen the ruins of Rome (says Dr. Clarke) the first suggestion made by a sight of the buildings in the Acropolis, is that of the infinite superiority of the Athenian architecture. It possesses the greatness and majesty of the Egyptian, or of the ancient Etruscan style, with all the elegant proportion, the rich ornaments, and the discriminating taste of the most splendid era of the arts."

THE AREOPAGUS,

WHICH is situated a few hundred feet west of the Acropolis, consists of an insulated rock, precipitous, and broken towards the south; on the north side it slopes gently down towards the temple of Theseus, and is rather lower than the Acropolis. "Ascending a hill (says Lamartine) covered with thistles and red pebbles, you arrive at the scene of the stormy



THE ACROPOLIS.

assemblies of the people of Athens, and of the fluctuating triumphs of its orators or its favourites; enormous masses of black stone, some of which measure twelve or thirteen cubic feet, lie upon one another, and support the terrace upon which the people collected. Still higher up, we perceive a huge square block, wherein steps have been cut, which probably served for the orator to mount his tribunal, which then overlooked the people, the city, and the sea. Demosthenes spoke from thence, and roused or calmed that popular sea, more stormy than the *Ægean*, which he could also hear roll behind him." Next, says Dr. Clarke, "we went to the Areopagus, wishing to place our feet upon a spot where it is so decidedly known that St. Paul had himself stood; and to view with our own eyes the same scene which he beheld, when he declared unto the Athenians the nature of the Unknown God, whom they so ignorantly worshipped. Before him there was spread a glorious prospect of mountains, islands, seas, and skies; behind him towered the lofty Acropolis, crowned with all its marble temples. This very object, whether in the face of Nature, or among the works of art, conspired to elevate the mind, and to fill it with reverence toward that Being, 'who made the world and all things therein.'"

It is melancholy to reflect that the monuments of Athens have become ruins only in comparatively recent times. The Propylæa and the Parthenon were converted by the Turks into powder-magazines; and, in 1656, during the siege of the city by the Venetians, these dangerous stores exploded, making dreadful havoc of these beautiful buildings. The Parthenon was finally spoiled of its remaining sculptures by Lord Elgin, under the plea that there was no protection for them in their original position. But protection might have been *sought* for them where they were, and where alone they had a right to be, as well as in the British Museum. In allusion to this spoliation, Lord Byron has the following lines—

Here let me sit upon this massy stone,
  The marble column's yet unshaken base;
Here, son of Saturn! was thy fav'rite throne:
  Mightiest of many such! Hence let me trace
The latent grandeur of thy dwelling-place.
  It may not be: nor even can fancy's eye
Restore what Time hath labour'd to deface.
  Yet, these proud pillars claim no passing sigh;
Unmov'd the Moslem sits, the light Greek carols by.

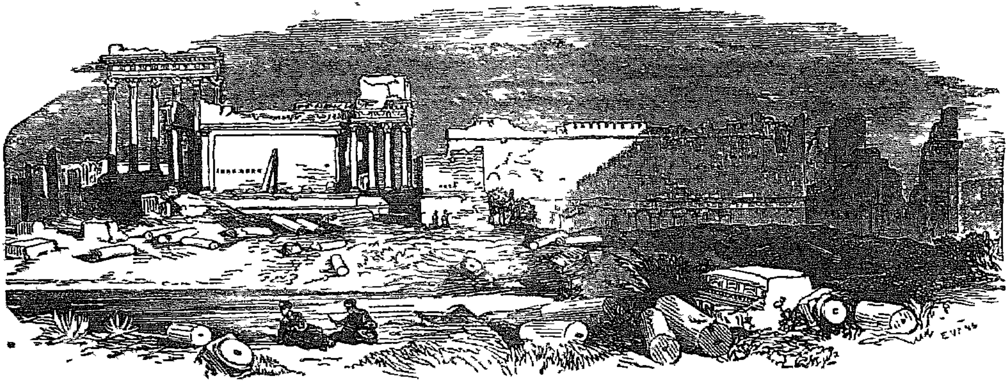
But who, of all the plunderers of yon fane
  On high, where Pallas linger'd, both to flee
The latest relic of her ancient reign;
  The last, the worst, dull spoiler, who was he?
Blush, Caledonia! such thy son could be!
  England! I joy no child he was of thine:
Thy free-born men should spare what once was free;
  Yet they could violate each saddening shrine,
And bear these altars o'er the long-reluctant brine.

RUINS OF BAALBEC.

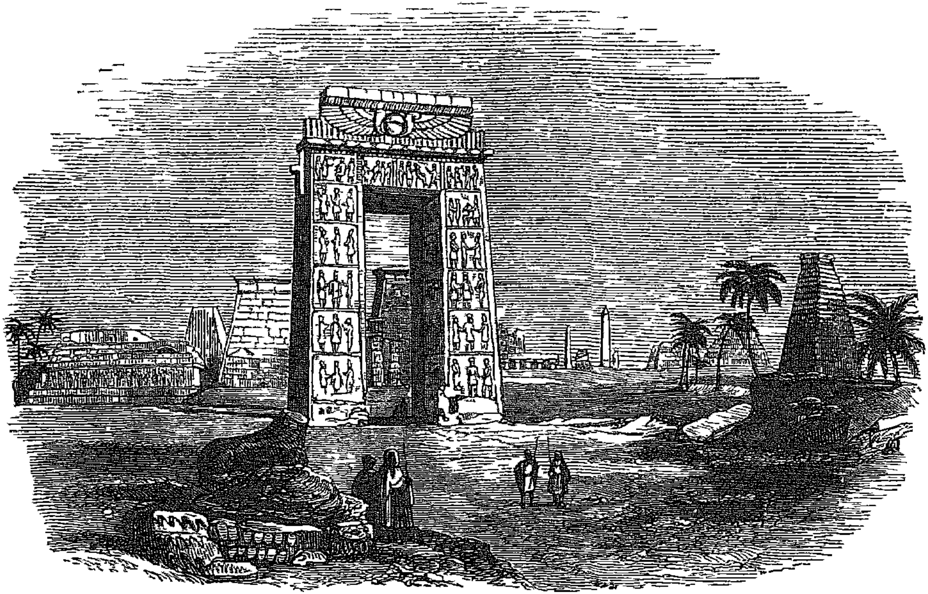
"Among the traces of a great nation's former glory (says Sir John Malcolm) there is none upon which the mind dwells with more serious thought than on the magnificent ruins of its ancient palaces. How forcibly are we reminded of our condition, when told that an edifice, in the erection of which a nation's wealth had been exhausted; which was adorned with every ornament that the art of the world can supply, *and whose history was engraven on the imperishable rocks on which it was constructed*, was not only fallen to decay, but that its founder was unknown, and the language in which its history was inscribed was no longer numbered among the tongues of man!" These observations are peculiarly applicable to the present state of Baalbec.

This city stood in the road between Tyre and Palmyra; its history is, nevertheless, so lost in obscurity, that, considering the splendour and magnificence of its remains, we are astonished. Scarcely anything of its history is known; and even its existence appears to have been unknown for many centuries to the Romans. Tradition states that it was built by Solomon; and for the truth of this the Jews quote the following passage from the book of Chronicles: "Also he (Solomon) built Beth-horon and *Baal-ath*." It is thought also that Baalbec is meant when Solomon says—"the tower of Lebanon looking toward Damascus." The Arabs go even so far as to assert, that this city was built by the king as a residence for the Queen of Sheba; and Sir William Ouseley quotes a Persian tradition that Solomon often passed the day at Baalbec, and the night at Istakr.

Baalbec is also called Heliopolis, both words having nearly the same signification. Heliopolis means the city of the sun; and the sun was worshipped by the ancient inhabitants of the country under the name of Baal. When we consider the extraordinary magnificence of the Temple of Baalbec, we are surprised at the silence of the Greek and Roman writers in regard to it. The only mention of it is in a fragment of John of Antioch, who attributes the building of it to Antoninus Pius. His words are: "*Alius Antoninus Pius built a great* temple at Heliopolis, near Libanus, in Phœnicia, which was *one of the wonders of the world*." Gibbon thus speaks of Baalbec and Emesa: "Among the cities which are indicated by Greek and oriental names in the geography and conquest of Syria, we may distinguish Emesa and Heliopolis; the former as a metropolis of the plain, and the latter as a metropolis of the valley. Under the last of the Cæsars they were strong and populous; the turrets glittered from afar; an ample space was covered with public and private buildings; and the citizens were illustrious by their spirit, or at least by their pride; by their riches, or at least by their luxury. In the days of Paganism, both Emesa and Heliopolis were addicted to the worship of Baal or the sun; but the decline of their superstition or splendour has been marked by a singular variety



BAALBEC.



RUINS OF BAALBEC.

of fortune. Not a vestige remains of the temple of Emesa, which was equalled in poetic style to the summits of Mount Libanus; while the ruins of Baalbec, invisible to the writers of antiquity, excite the curiosity and wonder of European travellers."

The ruins, as they now exist, are thus described by Lamartine: "On reaching the summit of the breach, we knew not where to fix our eyes. On every side we beheld marble doors of prodigious dimensions, windows and niches, bordered with exquisite sculpture, richly ornamented arches, fragments of cornices, entablatures, and capitals. The master-works of art, the wrecks of ages, lay scattered as thickly as the grains of dust beneath our feet. All was mystery, confusion, inextricable wonder. No sooner had we cast an admiring glance on one side, than some new prodigy attracted us on the other. Every attempt we made to interpret the religious meaning of the monuments was defeated by some newly-discerned object. We frequently groped about in this labyrinth of conjecture. One cannot restrict, in one's fancy, the sacred edifices of our age, or a people of whose religion or manners nothing certain can be known. Time carries his secrets away with him, and leaves his enigmas as sports for human knowledge. We speedily renounced all our attempts to build any system out of these ruins; we were content to gaze and admire, without comprehending anything beyond the colossal power of human genius; and the strength of religious feeling which had moved such masses of stone, and wrought so many masterpieces."

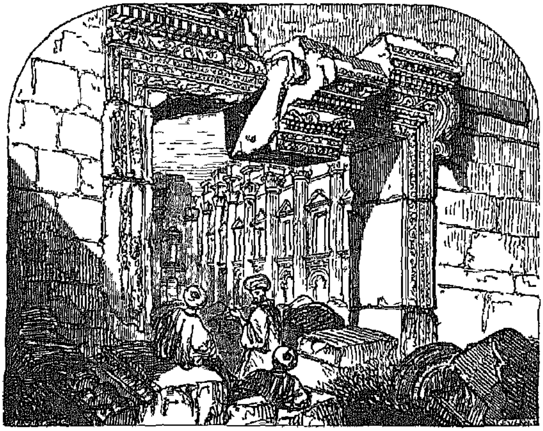
The ruins of Baalbec do not present a crowd of fallen edifices, spread over a large extent, like those of Palmyra; they consist only of three distinct buildings, which stand not far from each other, in a plain at a short distance from the inhabited part of the town. The most remarkable of these is the Great *Temple of the Sun*, which occupies a circuit of more than half a mile, and originally consisted of a portico, an exagonal court, and a quadrangle, besides the peristyles of the temple itself. Of this last six gigantic and highly-polished pillars, 71 feet 6 inches in height, and 23 feet in circumference, with their cornice and entablature, remain to attest the stupendous magnitude and beauty of the structure of which they made a part. They are formed out of two or three blocks, which are so perfectly fitted together, without cement or mortar, that the junction lines are scarcely discernible. They are composed of light yellow stone, presenting a sort of medium between the polish of marble and the deadness of turf. The subjoined cut [page 80] gives a beautiful view of the richly ornamented doorway.

"Here is another curiosity of this place (says Maundrell) which a man need be well assured of his credit, before he ventures to relate, lest he should be thought to strain the privilege of his credit too far. That which I mean is, the large piece of an old wall which encompasses all these structures last described. A wall made of such monstrous great stones, that the natives hereabouts (as it is usual in works of this strange nature) ascribe it to the architecture of the devil. Three of the stones, which were larger than the rest, we took the pains to measure. We found them to extend 61 yards in length; one 21, and the other two each 20 yards; and in the breadth of the same dimensions! These three stones lay in one and the same row to the end; the rest of the wall was made also of great stones, but none I think so great as these. That which added to the wonder was, that these stones were lifted up into the wall more than twenty feet from the ground!!" The stone of which the temple is built was brought from the neighbouring quarry, at the bottom of which there is *a single stone lying 70 feet in length*, 14 *in breadth, and* 14 *feet* 6 *inches in thickness!* Its weight, according to these dimensions, must be *above* 1130 *tons!!* It would require, we believe, the united strength of 60,000 MEN OF OUR TIME TO RAISE THIS SINGLE STONE!!!

In fact, the stones used at Baalbec are the largest that have ever been moved by human power. *The largest in the Pyramids of Egypt do not exceed* 18 *feet.* But here, of those that compose the sloping wall, which surrounds the temple on the west and north, three occupy a space of 175 feet and-a-half; viz., the first 58 feet 7 inches; the second, 58 feet 11 inches; and the third, exactly 58 feet long; each of them being 12 feet thick. "When it is considered (says Lamartine) that some of these blocks of hewn granite are raised one above another to the height of 20 or 30 feet from the ground; that they have been brought from distant quarries, and raised to so vast a height to form the pavement of the temple—the mind is overwhelmed by such an example of human power. The science of modern times cannot help us to explain it, and we cannot be surprised therefore that it should be referred to the supernatural. The shades of evening which slowly descended the mountains of Baalbec, and obscured, one by one, the columns and the ruins, imparted an additional air of mystery to the picturesque and magical effect of these wonderful works of man and time. We feel the full insignificance of human nature; and while contemplating the mass and eternity of these monuments, we compared man to the swallows, which build their nests for a season in the interstices of these stones, without knowing for whom, or by whom, or for what purpose, they were collected together. The power which moved these masses, and accumulated these blocks, is unknown to us. The dust of the marble which we trod under our feet knows more than we do, but can tells us nothing; and in a few centuries to come, the generations who may, in their turn, visit the wrecks of our monuments now existing, will ask, without being able to answer, why we laboured without being able to build and carve. The works of man are more durable than his thoughts; movement is the law of the human mind; the definite is the dream of man's vanity and ignorance; God is an object which incessantly recedes from us as we endeavour to approach him. We are continually advancing but we never arrive. The Deity whose divine figure man seems to embody in his imagination, and to enshrine in his temples, continually enlarges, and exceeds the narrow boundaries of our minds and our edifices; leaves the temples and the altars to crumble into dust; and summons man to seek him, where he is most plainly manifested, viz., in intelligence, in virtue, in nature, and in eternity."

To return to the ruins, "The enormity of the scale (says *Buckingham) and the magnificence of design, seen throughout* the whole of the architecture, with the boldness of the drawing, and the exquisite finish of the sculpture, impressed me with an idea of a labour more than human. I should conceive that in no country was to be found so superb a monument of the inimitable perfection of ancient architecture. The temples and the tombs of Egypt were here equalled in the enormity of the masses that composed them; and the chamber of the Pyramids rivalled in the closeness of the masonry; while the monuments of Athens itself, in the age of Pericles and Praxiteles, were at least equalled in the richness and beauty of the sculptured ornaments that adorned them. It appeared to me, that the temples of Edfou, Tentyris, and Thebes, fell far short of this, as a whole; for here the ponderous strength of the Egyptian, and the chastened elegance of the Grecian school, are both most happily combined.

The ruins are constantly becoming more ruinous. Dawkins and Wood found 9 large columns standing; but Volney, in 1784, found only 6. They reckoned 29 at the smaller temple;



GATE OF BAALBEC.

but now there are only 20. There were originally 34; the others were overthrown by an earthquake. Nature alone, however, has not effected this devastation. The Turks have had their share in the destruction of the columns; the motive for which was merely that of procuring the iron cramps, which served to join the several blocks of which each column is composed. The splendours of Palmyra rose, under the breath of a free commerce, in the midst of a sandy desert; but nothing has been able to preserve that and many other great cities from crumbling into heaps of ruins at the death-touch of that gloomy despotism that hangs like a pall over the East.

THE PALACE OF PERSEPOLIS.

"I know
The wealth," she cries, "of every urn,
In which unnumbered rubies burn,
Beneath the pillars of Chimnar."

Lalla Rookh.

"JEMSHEAD (says an old Persian author) built a fortified palace at the foot of a hill which bounds the fine plain of Murdasht to the north-west. The platform on which it is built has three faces to the plain and one to the mountain. It is formed of hard, black granite. The elevation from the plain is ninety feet; and every stone used in this building is from nine to twelve feet long, and broad in proportion. There are two great flights of stairs to this palace, and so easy of ascent, that a man can ride up on horseback. Each pillar is formed of a carved stone, is sixty feet high, and is ornamented in a manner so delicate, that it would seem to rival upon hard granite the sculpture of a carving upon the softest wood. There is no granite like that, of which these pillars are made, to be found now in Persia; and it is unknown from whence it was brought. Some most beautiful and extraordinary figures ornament this palace; and all the pillars which once supported the roof (for that has fallen) are composed of three pieces of stone, and joined in so exquisite a manner, as to make the beholder believe that the whole shaft is one piece." Another Persian historian says that king Jemshead, "having taken in a spot of ground, of twelve furlongs in length, (forty-eight English miles) there erected such a palace, that in the seven kingdoms of the world there was nothing that could equal it. The remains of that palace, and many of the pillars of it, are visible to this day; and he caused the palace to be called, *Chehul Minhar;* or the Palace of the Forty Pillars." To this account it is added that queen Homaie, who flourished about 800 years after Jemshead, added a thousand columns!

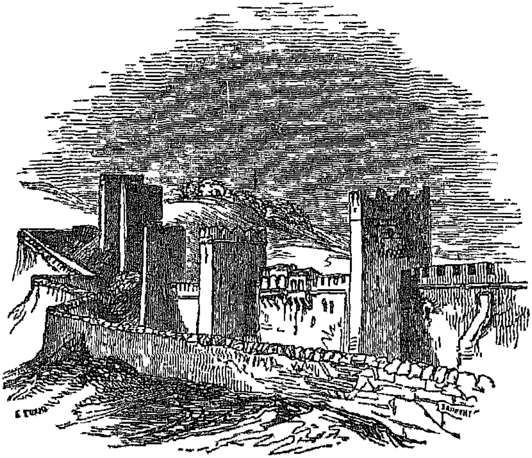
Diodorus gives another account of it. "Cambyses the son of Cyrus (says he) conquered Egypt, and led the workmen and architects into Persia, and caused them to build the palace of Persepolis and other cities." This statement is the most probable, and accounts for the Egyptian appearance of the ruins. The materials of which the palace is composed, are chiefly hard blue stone; but the doors and windows are of black marble, and so beautifully polished that they reflect objects like a mirror. This was amusingly shown on one occasion by a mastiff, who, seeing his own figure reflected on the walls, was worked up to fury, which was always increased by the view of the corresponding gestures in the reflected image; till the scene being repeated at every step, his owners were obliged to send him off.

In some places, the number of sculptures is so great that they bewilder the eye. Le Brun counted 1300 figures of men and animals, the half of which were as large as life, without including those on the tombs; and he counted the fragments of no less than 205 columns. The Hall of Pillars appears to have been detached from the rest of the palace, and to have had a communication with the other parts by hollow galleries of stone. It is strikingly grand, and conveys to the beholder the idea of a hall of audience of a powerful and warlike monarch The palace was the favourite residence of the kings. The front is entirely open to the garden, and it is sustained by a double range of columns, upwards of forty feet high, shooting up from the united backs of four lions of white marble. The exhaustless profusion of the splendid materials which reflect their own golden or crystal lights on each other, give the appearance of an entire surface, formed of polished silver and mother-of-pearl set with precious stones; a scene well fitted for an Eastern poet's dream, or some magic vision in the tales of an Arabian night. "Though at first sight (says Sir R. Kerr Porter), I acknowledge that a general resemblance to the Egyptian contour strikes the mind; yet the impression gradually wears away when the details are examined, the symmetry of the parts, and the grace and truth of the bas-reliefs, every where proclaiming the refined taste and master-chisels of Greece—when comparing the colossal proportions of the structure, and its gigantic sculptures, with the delicacy, beauty, and perfection of the execution of its ornaments, I might say, with the poet, 'Here the doves play on the bosom of Hercules!' Besides the admiration which the general elegance of their form, and the exquisite workmanship of their parts excited, I never was made so sensible of the impression of perfect symmetry, comprising also in itself that of perfect beauty. On ascending the platform on which the palace once stood, nothing can be more striking than the view of its ruins: so vast and magnificent, so fallen, mutilated, and silent; the court of Cyrus, and the scene of his bounties; the pavilion of Alexander's triumph, and, alas! the awful memorial of the wantonness of his power. But every object, when I saw it, was beautiful or desolate; amidst the pleasing memories of the past, awakening poignant regret, that such noble works of ingenuity should be left to the desert alone; that the pile of indefatigable labour should be destined, from the vicissitudes of revolution, and the caprice, ignorance, and fanaticism of succeeding times, to be left in total neglect; or, when noticed, doomed to the predatory mallet, and every other attack of unreflecting destruction."

The following spirited sketch is from the author of "Rough Notes of a Rough Ride from the East":—"We were in our saddles at the first break of day; and ere the sun's rays had gilded the few surviving capitals of Chehel Minor, its tall white columns stood before us in naked majesty at the foot of the bare and dreary ridge of mountains which bounds the wide alluvial plain of Murdasht. No other work of man was visible, except a few tents of wandering tribes—specks in the distant horizon. These stood in stately solitude, the pride of ages, which appear almost fabulous from their distance; of empires nearer by five centuries, to the time of Noah than to ours, and of which no trace remains; but here are sufficient to verify the narrations of their splendid existence, and to show, that, in some arts, and those among the noblest, our vaunted march of intellect is but an idle boast; indeed, were it not for the models we imitate—the more servilely the better—this 'march' would certainly be a countermarch. As it is, where is the modern city which will have such a glorious wreck as this, after its ephemeral, though perhaps more utilitarian, existence has passed away."

THE RUINS OF BABYLON.

HAVING sketched the principal Ruins of Baalbec and Persepolis, we turn to Babylon—a city to which the traditions of history give an almost unrivalled interest. Its site is occupied by the modern town of Hillah Here, over a space extending five or six miles in every direction, are spread the undoubted remains of that ancient "glory of nations," which none of the proud capitals of the ancient world ever rivalled in magnitude and the grandeur of its structures; and which is rendered still more imposing by the awful antiquity to which its origin ascends. It owed its foundation, or at least, its splendour, to Semiramis. Large additions were subsequently made, especially by Nebuchadnezzar. Babylon was thus the work of successive ages. The magnitude assigned to it by ancient writers is so immense, as to stagger belief. According to one account, the area within the walls was upwards of 72 square miles, *or nearly three and a half times that of London with all its suburbs!* According to another calculation, it was 188½ square miles, OR NINE TIMES THAT OF LONDON!! The population has been proportionately estimated at 5,000,000, or nearly treble that of London: but this is upon the supposition that the two cities resembled each other in structure, as well as in size, which was not the case. Babylon was an *inclosed district*, rather than a regular city. Perhaps, on the whole, we may estimate the population at from 1,000,000 to 1,200,000. This supposition



WALL OF BABYLON. (FROM AN ANCIENT COIN.)

derives support from the fact that Seleucia, with a population of 600,000, is stated to have been about half the size of Babylon, in the days of her greatest glory.

But though a population at all commensurate to the magnitude of the city, calculated on a scale of European density, be thus improbable, it does not by any means follow, seeing the way in which the area was partially filled up, that the magnitude itself is to be disbelieved. Herodotus visited the city in person, and while it was still in a state of tolerable preservation; and his account has been, with trivial exceptions, amply corroborated by the testimony of all succeeding writers, as well as by the investigations of modern travellers.

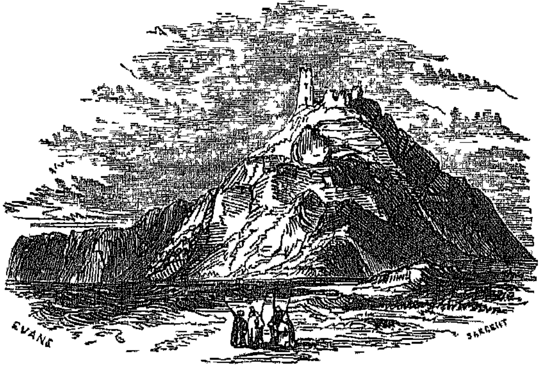
According to him, the city was built on both sides the Euphrates, and connected by a bridge. The streets were parallel, and the houses from three to four stories in height. It was surrounded by a deep and broad ditch, and by a wall of extraordinary dimensions, flanked with towers, and pierced by 100 gates of brass, 25 on each side. The walls were 365 feet high, and so broad, that six chariots might drive abreast along the top.

Among the structures, three were pre-eminent, and ranked among the *Wonders of the Old World.* One was the Palace, eight miles in circumference, enclosed within three successive walls; the interior of which was covered with paintings. Near it was the second wonder, that of the Hanging Gardens: these were raised, it is said, by Nebuchadnezzar, to gratify a Median queen, accustomed to the bold scenery of her native country, and disgusted with the tame uniformity of the Babylonian plain. Having undertaken to transport thither the landscapes of her own land, he raised masses of huge extent, supported by arches upon arches, and covered with deep earth, which not only produced plants and flowers, but presented *a range of wooded steeps similar to those in the mountains of Media!* Thirdly, the gigantic

TOWER OF BABEL,

Or Balus, was a still more celebrated structure, respecting which, tradition, fable, and history, are strangely blended. It was adorned by colossal images and statues of solid gold, the value of which has been rated by Herodotus at 5000 talents, or 21,000,000*l.* sterling. This is doubtless too high; and equally exaggerated has been its reputed height, which some Jewish authorities fix at twelve miles, and even Jerome quotes contemporary authority for its being four miles high. These ridiculous estimates give way before the sober testimony of Strabo, who states the height at 660 feet, exceeding only a little that of the highest pyramid. Herodotus describes it as a square tower, upon which, as a *foundation*, seven *other* towers rose in regular succession, the last tower having a large chapel, a magnificent couch, and a table of solid gold. The building was ascended from without by a winding stair. The space in which it was built was enclosed within walls, eight stadia in circumference, and consequently occupying above thirteen acres. The gates were of brass, and of extraordinary size. Herodotus saw them.

Babylon is at present the scene of utter desolation:—"The wild beasts of the forest lie there; the dragons howl in her pleasant places." Yet even now, after so many ages of desolation, and after so many great capitals have been built out of its ruins, enough remains to attest the fidelity of those who described it as the greatest capital of the ancient world—"the glory of kingdoms, the beauty of the Chaldee's excellency." Its mighty structures, indeed, are resolved nearly into their original elements; instead of walls and towers, we see only confused heaps of earth, bricks, and rubbish ; but these are piled almost in mountain masses ; and, seen afar along the Mesopotamian plain, proclaim still the wonders of a distant age. Mr. Rich has described four remarkable masses, which seem to be traceable. The first is a large mound, 1100 yards in length, 800 in breadth, and from 50 to 60 feet in height. Its great extent and loose texture, seem to suggest the idea of its being the *remains of the Hanging Gardens.* Another pile forms a square of about 700 yards, evidently the site of a finer and more elaborate structure. Several walls are entire, built of the finest brick, cemented with lime, ornamented with niches, and some remains of painting and sculpture. The natives call it the *Kasr*, or palace, and its appearance seems strongly to warrant that appellation. The third mound is evidently a royal cemetery. The fourth mound, ten miles distant from the preceding *(and still in the same city!)*, is probably the *Tower of Babel.* It is of an oblong form, 762 yards in circuit, and rises to the height of 192 feet. The bricks are of the finest description, and cemented with lime so closely, that it is nearly impossible to extract one entire! It has some appearance of having being built in stages, and on its summit there is a solid pile of brick, 37 feet high, diminishing in thickness to the top. In short, it is, in all respects, the greatest monument of Babylon. It is called by the Arabs,



BIRS NIMROUD, OR TOWER OF BABEL.

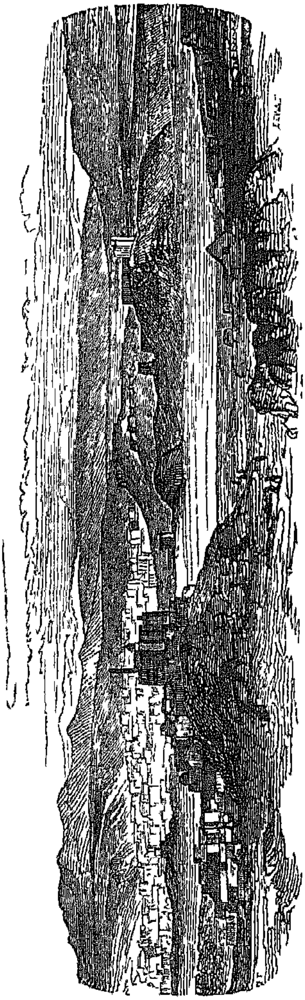
Birs Nimroud, and is thus described by Mr. Rich:—"I visited the Birs under circumstances peculiarly favourable to grandeur of effect. The morning was at first stormy, and threatened a severe fall of rain; but, as we approached the object of our journey, the heavy clouds separating, discovered the Birs frowning on the plain, and presenting the appearance of a circular hill, crowned by a tower, with a high ridge extending along the foot of it. It being entirely concealed from our view during the first part of our ride, prevented our acquiring the gradual idea, in general so prejudicial to effect, and so particularly lamented by those who visit the Pyramids. Just as we were within the proper distance, it burst at once upon our sight, in the midst of rolling masses of thick, black clouds, partially obscured by that kind of haze, whose indistinctness is one great cause of sublimity; whilst a few strong catches of stormy light, thrown upon the desert in the background, served to give some idea of the immense extent, and dreary solitude, of the wastes in which these remarkable ruins stand."

Struck by a thousand lightnings, still 'tis there,
As proud in mien, as haughty in despair;
Oh! oldest fabric reared by the hands of man,
Built ere Art's dawn o'er Europe's shores began!
Rome's mouldering shrines, and Tadmor's columns grey,
Beside yon mass, seem things of yesterday!
In breathless awe, in musing reverence bow,
'Tis hoary Babel looms before you now.

NINEVEH.

Far away—a thousand miles—from the highways of modern commerce, and the tracks of ordinary travel, lay a city buried in the sandy earth of a half-desert Turkish province, with no certain trace of its place of sepulchre. Vague tradition said that it was hidden somewhere near the river Tigris; but for above two-thousand years its known existence in the world was a mere name—a word. That name suggested the idea of an ancient capital of fabulous splendour and magnitude; a congregation of palaces and other dwellings, encompassed by walls and ramparts, vast but scarcely real. More than two thousand years had it thus lain in its unknown grave, when a learned Frenchman and a wandering Englishman, urged by a noble inspiration, sought the seat of the once powerful empire, and searching till they found the dead city, threw off its shroud of sand and ruin, and revealed once more

BABYLON.



NINEVEH.

to an astonished and curious world the temples, the palaces, and the idols; the representations of war, and the triumphs of peaceful art of the ancient Assyrians. The Nineveh of Scripture, the Nineveh of the oldest historians; the Nineveh—twin sister of Babylon—glorying in a civilization of pomp and power, all traces of which were believed to be gone; the Nineveh, in which the captive tribes of Israel had laboured and wept, was, after a sleep of twenty centuries, again brought to light. The proofs of ancient splendour were again beheld by living eyes, and by the skill of the draftsman and the pen of antiquarian travellers, made known to the world. *

Let the reader now at once fancy himself transported across the Desert, or up the Tigris, to the city of Mosul. He is invited thither, not to gaze on its old walls, which withstood the fierce Saladin's hosts, or its streets, which Genghis Khan once deluged with blood; nor to watch the many caravans which enter and emerge by its eight gates; nor to mark the manners of its large and motley population. Mosul is the starting point of Assyrian research; we will therefore at once cross the Tigris, here four-hundred feet wide, by the ricketty bridge of boats, and thus gain the eastern side of the river. Arrived here, the first objects that strike us are two shapeless mounds, which contain traces of works bearing a striking resemblance to the Roman camps still extant in our own country. This is the scene of the most remarkable discoveries made by Layard. "In such a country as this (says Rich), it is not easy to say what are ruins, and what are not; what is art, converted by the lapse of ages into a semblance of nature, what is merely nature, broken by the hand of time into ruins, approaching in their appearance to those of art." "These colossal piles (says another traveller) are found domineering over the dreary waste, to the uniformity of which they offer a striking contrast, being visible at great distances; and, although thrown by the mirage into strange and contorted shapes, yet they always appear, when seen upon the verge of the horizon, as if possessing colossal dimensions, and produce an effect in point of grandeur and magnificence which cannot be imagined in any other situation." Further, that enlightened scholar, to whose spirit of enterprise the learned world is so much indebted for the most wonderful and important discoveries in these regions,—we refer to Dr. Layard—says, "The traveller is at a loss to give any form to the wide heaps upon which he is gazing. The more he conjectures, the more vague the results appear. The scene around is worthy of the

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* Bonomi.

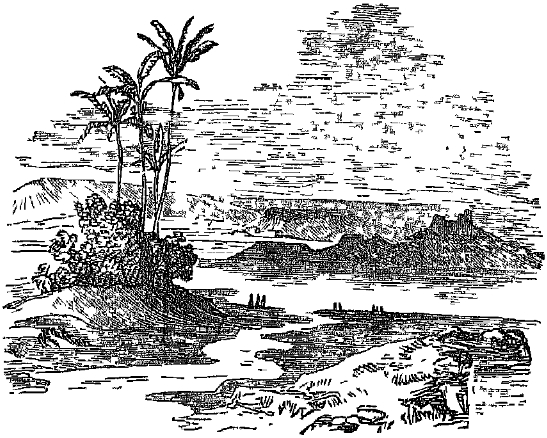
ruin he is contemplating, desolation meets desolation; a feeling of awe succeeds to wonder, for there is nothing to relieve the mind, to lead to hope, or to tell of what has gone by. These huge mounds of Assyria made a deeper impression upon me, gave rise to more serious thought and more earnest reflection, than the temples of Baalbec, or the theatres of Ionia."

Such was the mystery which hung over these mighty heaps when Layard first saw them. But he resolved to penetrate the mystery, and he has done it!

"I had traversed, continues this enterprising man, Asia Minor and Syria, visiting the ancient seats of civilization, and the spots which religion has made holy. I now felt an irresistible desire to penetrate to the regions beyond the Euphrates, to which history and tradition point as the birth-place of the wisdom of the west. Most travellers, after a journey through the usually frequented parts of the east, have the same longing to cross the great river, and to explore those lands which are separated on the map from the confines of Syria by a vast blank stretching from Aleppo to the banks of the Tigris. A deep mystery hangs over Assyria, Babylonia, and Chaldea. With these names are linked great nations and great cities, dimly shadowed forth in history; mighty ruins in the midst of deserts, defying, by their very desolation and lack of definite form, the description of the traveller; the remnants of mighty races still roving over the land; the fulfilling and fulfilment of prophecies; the plains to which the Jew and the Gentile alike look as the cradle of their race. After a journey to Syria the thoughts naturally turn eastward; and without treading on the ruins of Nineveh and Babylon, our pilgrimage is incomplete.

"As we journeyed thither we rested for the night at the small Arab village of Hamusum, all around which are still the vestiges of an ancient city. From the summit of an artificial eminence we looked down upon a broad plain, separated from us by the river. A line of lofty mounds bounded it to the east, and one of a pyramidical form rose high above the rest. This was the pyramid which Xenophon had described, and near which the ten thousand had encamped, the ruins around it were those which the Greek general saw twenty-two centuries before, and which were even then the ruins of an *ancient* city." Dr. Layard believed these mounds to be none other than the ruined heaps of the great city of Nineveh, though about the accuracy of this opinion there are disputes among the learned.

One night, in the month of November, 1845, an old Arab and his family were seated in their hut, in the midst of a desert, close by the Tigris. As the evening had set in, a traveller and his party came to the door of the hut, and asked permission to lodge for the night. The head of the party sat down on a sack in a corner of the cottage, and began to speak to Awad (for that was the old man's name) about Assyria and Nineveh. The countenance of the bearded father of the desert brightened up. He began to tell many stories about Nimrod and other, and about their buried palaces, which he described as being below the very place where they were sitting. The traveller and his party listened with stirring interest. This stranger was Layard. He had come for the very purpose of trying to find out the ruins of buried Nineveh. This was not his first visit to these mounds round Mosul, nor was he the first who had the merit of making the discoveries, M. Botta, an able and enterprising Frenchman, consul at Mosul, had already dug up some interesting remains in the same neighbourhood. But Layard's discoveries are the latest, and most wonderful; and have, therefore, made the most noise. Well, at the dawn of the morning after he arrived at Awad's hut, he found the old chief by the side of his sack, telling him that the sun was up, and that he had procured a number of Arab workmen, who were waiting outside ready to commence operations. They began to dig into the mound of Nimrod. He had the strongest hopes that by digging deep into this mound, he might come to some ancient and interesting ruins—perhaps the very remains of the old Assyrian capital, whose *foundations* Nimrod had laid 4000 years ago! How could he tell but that he might discover some of those splendid temples and palaces which Jonah and Ezekiel once saw, and in which proud Sennacherib once lived and worshipped! We need not tell you of the difficulties this illustrious traveller had to contend with. The people of the country were jealous of him. Some thought he came to dig for gold—others that he had a plot against the government—others said, that he would destroy the tombs of their prophets, and draw down the anger of God. In addition to this, the Arab workmen often quarrelled among themselves; but he overcame all obstacles. Strange and interesting must have been the sight of these workmen. The Chaldeans, in their striped dresses and curiously peaked caps, are digging busily in the earth. Wild looking Arabs, with long hair and bare limbs, each with a basket in his hand, are working in the trenches and pits underground. When they came out from



ANOTHER VIEW OF NINEVEH.

below to empty their baskets, they are seen jumping and shouting in the strangest manner. They immediately return, and are lost again from sight in the bowels of the earth, while now and then wild strains of kurdish music are heard ascending from different parts of the ruins. What was his success? He no sooner had begun to break into the earth than his hopes were fulfilled. At first he began by finding fragments of brick and pottery, with the curious arrow-headed characters or letters inscribed on them. Every succeeding day brought the workmen to new wonders—beautiful specimens of alabaster and marble carving—figures of various kinds standing out from the stones (called bas-relief) representing kings and chariots, cities and sieges, captives, priests, and sacred trees. On other slabs were found hunting scenes, as if Nimrod's descendants shared in his love for the chase. There were also strange devices painted in bright colours on tiles. The horses on the sculptures are also wonderful. They are generally represented covered with rich trappings, and at full gallop, as if rushing on to battle, answering to the description of Habakkuk, "Their horses are swifter than the leopards, and more fierce than the evening wolves," while the horsemen, with graceful figures, and richly attired, remind us of Ezekiel's description: "Horsemen riding upon horses, all of them desirable young men, princes to look to." There are several striking representations of the siege of cities. The besieged on the top of the walls are seen discharging arrows and darts at the enemy. Wounded soldiers are represented tumbling down from the towers; women are depicted tearing their hair, which in the East was the sign of grief; or stretching out their arms, imploring their foes to have mercy upon them. The enemy are represented, in others, planting their scaling-ladders against the walls to climb up upon them, or bringing war-engines, called battering-rams, to beat them down. If the battle or siege be over, we have the conqueror leading the captive soldiers behind his car of triumph, with the women and children, and other spoil; or men bringing the heads of those slain in battle, and laying them at his feet. You will not be surprised at the number of these figures and devices when you bear in mind that, in the early age of the world, not only the invention of printing, but even paper, and the art of writing, were unknown. How then were they to write the history of their nation? How could they hand down to future ages an account of their kings and warriors—their battles and victories? *Their historians used the chisel instead of the pen.* They carved rude pictures of every great event on stone and marble. Instead of having, like us, libraries and books, they had their houses and walls, and especially their palaces and temples, covered with stones on which were hewn the records of the empire. Thus are the events in Assyrian history, which happened 2000 years ago, strikingly brought to light again by the digging up of these *stone libraries.*

The ancient worlds their mysteries yield,
The Chaldean sages' secrets are unsealed;
The history of old time, that seem'd undone,
Proves in the last of days but yet begun;
And prophecy awaits the child of time,
To give fresh beauty to its truths sublime!

Many of Layard's most remarkable discoveries were made in what he has styled the north-west palace, and it was there that gigantic head was exposed to view, so graphically depicted in one of the illustrations to his interesting work, with the wondering Arabs grouped around it in wondering amazement. "I rode (says the traveller) to the encampment of Sheikh Abdur-rahman, and was returning to the mound, when I saw two Arabs of his tribe urging their mares to the top of their speed. On approaching me they stopped. 'Hasten, O Bey,' exclaimed one of them—'hasten to the diggers, for they have found Nimrod himself. Wallah, it is wonderful, but it is true! We have seen him with our eyes. There is no God but God;' and both joining in this pious exclamation, they gallopped off, without further words, in the direction of their tents. On reaching the ruins, I descended into the new trench, and the Arabs withdrew the screen they had hastily constructed, and disclosed an enormous human head sculptured in full out of the alabaster of the country. They had uncovered the upper part of a figure, the remainder of which was still buried in the earth. I saw at once that the head must belong to a winged lion or bull, similar to those of Khorsabad and Persepolio. It was in admirable preservation. The expression was calm yet majestic, and the outline of the features showed a freedom of knowledge and art, scarcely to be looked for in the works of so remote a period. I was not surprised that the Arabs had been amazed and terrified at this apparition. It required no sketch of imagination to conjure up the most strange fancies. This gigantic head blanched with age, thus rising from the bowels of the earth, might well have belonged to one of those fearful beings which are pictured in the traditions of the country, as appearing to mortals, slowly ascending from the regions below. While I was superintending the removal of the earth, a noise of horsemen was heard, and presently Abdur-rahman, followed by half his tribe, appeared on the edge of the trench. As soon as the two Arabs had reached the tents, and published the wonders they had seen, every one mounted his mare and rode to the mound to satisfy himself of the truth of these inconceivable reports. When they beheld the head, they all cried together, 'There is no God but God, and Mahommed is his prophet!' It was some time before the sheik could be prevailed upon to descend into the pit, and convince himself that the image he saw was of stone. 'This is not the work of men's hands (exclaimed he) but of those infidel giants of whom the prophet, peace be with him! has said, that they were higher than the tallest date tree; this is one of the idols which Noah, peace be with him! cursed before the flood! In this opinion all the bystanders concurred. The report of the discovery filled Mosul with commotion. The cadi made this a new occasion for throwing impediments in the way, and the explorations were for some time arrested. By judicious management, however, these obstacles were overcome, and it was from the chambers of this palace that many of the most interesting relics now in the British Museum were brought. Mr. Layard gives a most interesting account of the removal of this huge figure from the Nimroud mound to the banks of the Tigris. He directed some Arabs to go to the mountains to cut some mulberry-trees, in order to construct a strong waggon to place it upon. He purchased a pair of iron axles, which had formerly belonged to M. Botta and the mulberry wheels were bound with iron hoops. Across the axles were laid three beams, and above them several cross beams of the same wood. Large iron rings were also fastened in for ropes, to enable the Arabs as well as buffaloes to draw the cart. This singular waggon became an object of wonder to all in the town of Mosul, and crowds came to inspect it. At last it was brought into the deep trench cut in the mound, in order to receive the monster bull. The latter was lowered from its place by means of ropes and thick rollers well greased, which had been obtained from the mountains. It was a moment of great anxiety. The Chaldeans and Arabs were half frantic with excitement. The air resounded with their music and war cries. Great was the disappointment when, after advancing a little, the cable and ropes all gave way, and the great bull rolled to the ground! It escaped quite uninjured. Next morning it was ready to be dragged to the river. Buffalos were fast harnessed, but they refused to pull. The Arabs, however, were not so unwilling; and a procession was formed, headed by Layard himself on horseback. Immediately after him came a band of musicians, then followed 300 men dragging the cart. They were dragging it in capital style, when the wheels sunk into a pit and the ropes broke. Next morning it was at length dragged to the river side. After some difficulties they succeeded in getting it to the raft; and Layard with honest pride watched it until it disappeared from his sight behind a projecting bank, the Pasha came to witness the wonderful exploit.

"The Pasha was accompanied by a large body of regular and irregular troops, and three guns. He visited the ruins, and expressed no less wonder at the sculptures than the Arabs; nor were his conjectures as to their origin and the nature of the subjects represented, much more rational than those of the sons of the desert. The gigantic human-headed lions terrified as well as amazed his followers. 'There is no God but God,' was echoed from all sides. 'These are the idols of the infidels,' said one more knowing than the rest. 'No, my lamb,' exclaimed a more aged and experienced Turk, 'I have seen the images of the infidels; they are dressed in many colours; and although some of them have wings, more have a dog's body and a tail; these are the works of the Jín, whom the holy Solomon, peace be with him! reduced to obedience, and imprisoned under his seal. 'I have seen something like them in your apothecaries' and barbers' shops,' said I, alluding to the well-known figure, half woman and half lion, which is met so frequently in the bazaars of Constantinople. 'God forbid,' piously ejaculated the Pasha; 'that is the sacred emblem of which true believers speak with reverence, and not the handiwork of infidels.' 'There is no infidel living,' exclaimed the engineer, who was looked up to as an authority upon these subjects, 'either in Frangistan or in Yenghi *Dunia* (America) who could make anything like that; they are the work of the Magi, and are to be sent to England *to form the gateway to the palace of the Queen.*' 'May God curse all infidels and their works!' observed the *cadi's deputy*; 'what *comes from* their hands is of Satan; *it* has pleased the Almighty God to let them be more powerful and ingenious than the true believers in this world, that their punishment and the reward of the faithful may be greater in the next.'"

It is impossible to describe the various discoveries made in our limited space. But before leaving Nineveh as it is, let us glance at Nineveh as it was. To go round it is a journey of 60 miles; its walls are 100 feet high, and 1500 towers are built on the walls to defend it from its enemies. As we walk along the Tigris, which runs through it, we see lovely palaces and temples, surrounded with terraced gardens coming down to the river's bank. Towering above them all, with terrace upon terrace of baked clay, is the palace of the king. Sculptured lions in white alabaster, with wings like eagles, are on each side of the entrance; and in the great halls we see bricks and tiles covered with various devices, glancing brilliantly in the Eastern sun. The floor we tread upon is paved with slabs of marble, covered with letters and figures. The roof above us is inlaid with ivory and precious woods, studded with plates of silver and gold, to support the cedar-beams. Priests and cup-bearers are hurrying past us. The sound of music falls now and then upon our ears. Delightful perfumes are wafted from the king's gardens. Chariots with warriors and prancing horses are rolling along the streets, while the hum of the great city is heard all around. Not that Nineveh or Babylon, or ancient cities generally, were crowded with houses, or contained an equal population with the same space as our modern cities, such as

NINEVEH.—REMOVING THE WINGED BULL. See p. 95.

London and Paris. Nineveh was larger in extent than London, but not so populous. The number of its inhabitants is unknown, and conjectures vary from 600,000 to 2,000,000. Such was Nineveh—"an exceeding great city,"—

How like a star she fell and pass'd away!

THE RUINS OF GOUR,

THE ANCIENT METROPOLIS OF BENGAL.

"SEVEN hundred and thirty years B C., Gour was the capital of Bengal, or Goura, as the country was then called. The extent of its ruins is nearly fifteen miles in length, by three in breadth, or rather, I should say, the extent of that space on which ruins may yet be discovered, and the whole of which was once covered with buildings, and crowded with inhabitants. But where, you ask, are these ruins?—as, toiling through bush and long grass, now crossing a field which some *ryot* has formed, now wading through pools of water, or ferrying across them, you make your way from point to point, and find only the ruins of seven or eight mosques, the half-broken-down walls of a large Moorish fortress, and two strikingly grand and lofty gates of a citadel, evidently built by Mahommedans; where are the traces of that city, the data of whose most flourishing existence can be followed back to a period of time so awfully remote—a period thirteen centuries before the birth of the prophet Mahomet? Why here; enter this ruined mosque; look at this block of marble, so curiously wrought! Observe the Arabic characters so fairly sculptured on it Now pass to the other side. You will see the Sanscrit inscription originally cut upon it, and the pagoda it long adorned was overthrown, to furnish materials for the erection of this mosque, styled by distinction, the Golden. The remains of it are, indeed, very noble. It is faced throughout with the most precious black marble. Many, however, of the inferior mosques are, upon the whole, in higher preservation; their domes still perfect, and lined within by painted tiles, of the most vivid colours, highly glazed, and probably as bright as on the day they were laid. One of the smallest of these mosques has a tesselated pavement of great beauty. The gates of the citadel are very grand; one especially is of a loftiness and span which forcibly recall the days of Humayom and Acbar; as does more powerfully an imperial *minar*, the giant top of which has fallen in shattered fragments at its feet. The proud monument stands in the very centre of these ruins; and from its dizzy and tottering head, your eye may command the whole of that desolate tract which the city once covered. The processions, the Moorish squadrons, with their crowded spears and glittering sabres, the elephants, matchlock-men in groups over the gateways, and on the city walls, and a turbaned throng covering the space below, rise and show you Jennetabad (as it was then called) in the sixteenth century. The ruins of this city, and of Gour also, have furnished materials both for building and ornament, to Moorshedabad, Maldah, Rajemahl, Dacca, and many other places, during the last century, and at different periods long before. With something like a feeling of disappointment that the traces of Gour should be so few, you would leave the spot, your eye yet lingering in its gaze, till the red soil adhering to your foot seems to say: "you are treading on the ruins of Gour." This soil is formed of bricks, now mouldered or crumbling beneath your tread, but fashioned by the hand of man long ages ago. Here, in the dust, lie the temples, the palaces, the dwellings, of the city whose memorial you seek.

"I walked slowly towards my boat. It was late; and from the ruins of a mosque and wall near some large tamarind-trees, I saw, springing with many a fantastic gesture, several of those large-sized sacred monkeys: they fittingly represented satyrs, dancing in wild mockery on this desolate spot. A marble tomb near me reminded me of the days of Acbar. Could I have broken the slumber of its tenant, how had he grieved and wondered! Before him, Jennetabad in ruins, and beyond, no sign of camp or arms, war-horses, or Moorish standards. And yet, how strange to think, that, could you raise at your bidding an inhabitant of Gour, who perished two thousand years before, and place him where those trees might be supposed to shelter and to shade your small ghaut, and show him that group of Brahmins, with their brazen vessels and flowers, performing their ablutions in the stream, he would not fancy more than one might have dreamed away, and, bathing himself, would prepare to re-enter the city in their company. So that, after all, we have ruins of Gour more striking to the mind than the half-standing columns of Babylon, or the more perfect temples of Egyptian Thebes. We have the helpless, blind, and feeble posterity of an erring and fallen race, clinging to the gods of their fathers, with a pertinacity at once to be admired and pitied."*

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* "Sketches of India."

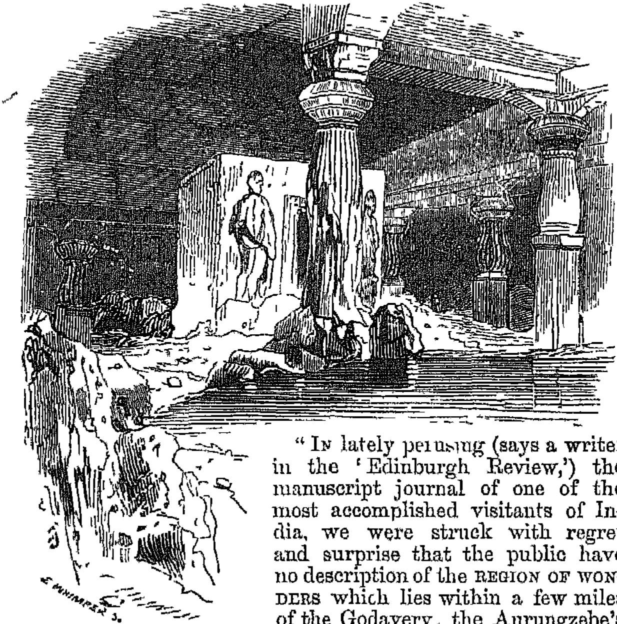
Exclusive of the suburbs, this city must have covered an area of full seventeen square miles; and, with the suburbs, a space of nearly sixty square miles; whereas Calcutta with its suburbs, can scarcely be computed at more than fifteen. Taking the population of Calcutta at only half a million, Gour, if equally populous, must have contained two millions. At all events, the number of its inhabitants must be supposed to have exceeded the population of any capital now existing, unless it be Pekin. In the midst of the city stood a fort nearly square, extending about a mile on every side. The ruins of this fort at the present moment sufficiently mark both its site and its extent. The ramparts now remaining are, in some places, full sixty feet high, and have *widely branching trees growing on their very summit.* Within this fort, there is a wall now standing, nearly a quarter of a mile in extent, and in some places between seventy and eighty feet in height.

Another traveller thus describes the remaining ruins—"We proceeded first to what is termed by the natives the Great Golden Mosque. This noble building appears to have stood nearly in the centre of this ancient capital. It was built of brick; but it was ornamented on the outside with a kind of black porphyry, which almost covered the walls, of which only a small part now remains: this, with other ruins, having for ages formed the quarry whence every one near, who wished marble for a floor, or a chimney-piece, has furnished himself. Even the cathedral church of Calcutta was, at its erection, indebted to these venerable ruins, which have also originated many of the monuments in the cemeteries at Calcutta. Its internal structure presents a singular appearance. It evidently contained no one space of fifteen feet square: its breadth is divided into six ranges, somewhat resembling the aisles of an ancient Gothic church. The rows of columns closed over each aisle, and thus formed six semicircular roofs, covering and extending the whole length of each aisle. The roof, when entire, rose in *sixty lofty spires;* which gilt and ornamented as they are in other Mussulman capitals, must have presented a most superb spectacle. The *painted mosque* is the most entire of any structure now remaining. The outer walls, though nine feet in thickness, are formed of bricks extremely small, not exceeding four inches in length, and three in breadth, and an inch and a half in thickness; but these bricks are so well made, and the cement is so firm, that the building has almost the solidity of stone. The surface of these bricks is painted yellow, white, green, and blue, in alternate succession; and the whole appears to have been finished with a neatness approaching to finery. The east, the north, and the south sides have three doors, forming nine in the whole; on the west side it is closed. The space within forms a beautiful room, the four walls closing above and forming a majestic dome, which, when illuminated, must have had a most pleasing appearance. The building is so entire, that this room might now with ease be converted into a hall for the administration of justice, or Divine worship. *So spacious and lofty a room without a pillar, beam, or rafter, none of us had ever seen;* and when the antiquity of the building, the smallness of the bricks which compose it, and its present high state of preservation are considered, it seems evident that the art of building, so far as durability is concerned, was far better understood in Bengal formerly than is indicated now by any modern edifice in the metropolis of India.

"The south gate of the city has a majestic appearance. The arch of it is thirty feet wide,—on each side is a piece of masonry sixty feet square, and in height nearly equal to the outside of the arch surmounting the gateway, which is somewhat better than sixty feet. There is an ascent by which it is easy to get to the top of the gateway: some of us went as far as its ruinous state would permit, and enjoyed thence a fine view of the country round." Bats and owls take refuge in the mouldering ruins, which are the haunt also of wild *beasts of the desert, as in Babylon.* "*Wild beasts of the* desert shall lie there; and their houses shall be full of doleful creatures; and owls shall dwell there."

THE CAVE-TEMPLES OF INDIA.

THE CAVE OF ELEPHANTA.



"In lately perusing (says a writer in the 'Edinburgh Review,') the manuscript journal of one of the most accomplished visitants of India, we were struck with regret and surprise that the public have no description of the REGION OF WONDERS which lies within a few miles of the Godavery. the Aurungzebe's magnificence at Aurungabad, the *unparalleled* fort of Dowlutabad, and the excavations of Ellora, which dispute with the Pyramids the *first place* among those works which are undertaken to display power and to embody feeling, without being subservient to any purpose of utility."

THE CAVE-TEMPLES OF KENNERY,

Which are formed out of a high knoll in the middle of the range of hills which divides the island of Salsette, adjoining Bombay, into two nearly equal parts. They are scattered over both sides of the hill at different elevations, and are of various sizes and forms. The largest and most remarkable is a Budhist temple of great beauty and majesty. It is entered through a fine lofty portico, on each side of which is a colossal statue of Boodh, with his hands raised in the attitude of benediction. Within, the apartment is ninety-one feet long, and thirty-eight feet broad. The length of the whole temple (portico and area leading to it) is 142 feet. It is surrounded on every side but that of the entrance with a colonnade of octagonal pillars; the ceiling is arched semicircularly, and ornamented, in a very singular manner, with slender ribs of teak-wood, of the same curve as the roof, and disposed as if supporting it; which, however, it does not require. The innumerable caves formed in every part of the hill are square and flat-roofed. The whole appearance indicates it to have been *a rock-hewn city, capable of containing many thousand inhabitants!* The largest temple was doubtless their principal place of worship. The resemblance of all this to Petra, already described, must strike every reader. And it is not only the numerous caves that give an idea of what the population of this barren rock must once have been, but the tanks, the terraces, and the flights of steps which led from one part to another. Yet now, not a human footstep is to be heard, except when the curiosity of a traveller leads him to pay a hasty visit to the ruined habitations of those whose very name has passed away, and whose cultivated fields are become an almost impassable jungle, the haunt of tigers, and the seat of pestilence and desolation.—We shall now visit the celebrated cave temple of

ELEPHANTA.

This has been called the "*Wonder of Asia*," and has been often visited by travellers. It is situated on an island of the same name, near Bombay, and derives its name from containing a stone elephant, about three times as large as life, rudely sculptured out of an insulated black rock. It is now much dilapidated; and the animal on its back, supposed to be a tiger, has no longer any distinguishable shape. From the landing-place, a steep and narrow path winds up the hill, through woods, and on the brink of precipices. About half a mile further is the *great cave*, in a magnificent situation, and deserving, Bishop Heber says, all the praise which has been lavished on it. It is 220 feet long by 150 broad, exceeding in these dimensions the largest work at Salsette, but of very inferior height. Notwithstanding its richer and more numerous decorations, the spectator is continually reminded of being in a cave. At Salsette, the lofty concave roof and noble columns have a majestic appearance; yet the observer feels more surprise and admiration at the Elephanta. He beholds four rows of massive columns, cut out of the solid rock, so as to form three magnificent avenues to the grand idol, which terminates the middle vista; the general effect being heightened by the blueness of the light, or rather gloom, peculiar to the situation. The central image is composed of three colossal heads, reaching nearly from the floor to the roof, a height of fifteen feet. The whole temple is full of images and sculptures, a description of which would be both tedious and disgusting. We pass on to other similar wonders of this district; and on the way to Poonah, we come to

THE CAVE OF CARLEE,

Which is hewn on the face of a precipice about two thirds up the side of a steep hill, rising to the height of more than 800 feet above the plain. The excavations consist, besides the principal temple, of many smaller apartments and galleries in two stories, some of them ornamented with great beauty, and evidently intended, like those of Kennery, for hermits. The temple itself is on the same general plan as that of Kennery, but *half as large again*, and far finer and richer. It is approached by a steep and narrow path winding up the side of the hill, among trees and brushwood, and fragments of rock. "I asked (says Bishop Heber) some boys who offered their services to show its wonders, who was its founder, and they answered, 'King Pandoo'; who is, indeed, as Mr. Elphinstone afterwards told me, the reputed architect of all these cave-temples, and in general, like our Arthur, of all ancient monuments whose real history is unknown. The approach to the temple, is like that at Kennery, under a noble arch, and within the portico are three colossal figures of elephants. The internal screen is covered with male and female figures. I asked our young guides, what deities these represented, and was surprised to hear from them in answer: 'These are not gods; one god is sufficient; these are *viragees*' (religious enthusiasts). In its dimensions and execution this temple is much nobler and more elaborate than Kennery The capitals of the columns are very singular and beautiful. Each consists of a large cap, like a bell, finely carved, and surmounted by two elephants, with their trunks entwined, and each carrying two male and one female figure, which our guides again told us were *viragees.* The interior is extremely clean and in good repair, and would be, in fact, a very noble temple for any religion."—Proceeding onward, we come to

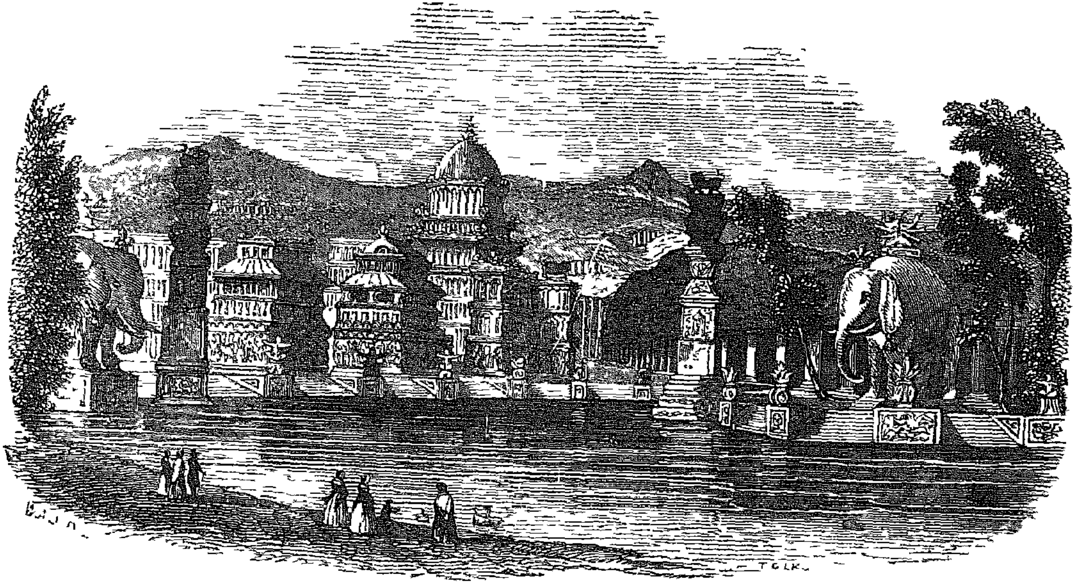
THE WONDERS OF ELORA,

As they are called by Captain Seeley, who devotes a whole volume to their description. The excavations are in a crescent-shaped hill, of moderate height. The first view of this rock-city is grand and striking, but melancholy. The number and magnificence of the subterranean temples, the extent and loftiness of some, the endless diversity of sculpture in others, the variety of curious foliage, of minute tracery, highly-wrought pillars, rich mythological designs, sacred shrines, and colossal statues, astonish but distract the mind. From their number and diversity, it is impossible to form any idea of the whole; and the first impressions only give way to a wonder not less natural, that such prodigious efforts of labour and skill should remain, from times not certainly barbarous, without a trace to tell us the hand by which they were designed, or the populous and powerful nation by which they were completed. The empire, whose pride they must have been, has passed away, and left not a memorial behind it.

We now quote from Captain Seeley: " About one P.M. my people arrived; and I hurried them on to Elora, for, although *both tired and hungry, I could not resist proceeding at once* to the glorious scene which awaited me at the eternal temples and houses in the mountain. No inducement could have prevailed upon me to stop another half-hour. Bruce's emotions were not more vivid or tumultuous on first beholding the springs of the Nile, than mine were on reaching the temples of Elora. I at once rushed into the wonders and glories of these immortal works; but it is totally impossible to describe the feelings of admiration and awe excited on the mind upon first beholding these stupendous excavations. On a close approach to the temples, the eye and imagination are bewildered with the variety of interesting objects that present themselves on every side. The feelings are interested to a degree of awe, wonder, and delight, that at first is painful, and it is a long time before they become sufficiently sobered and calm to contemplate with any attention the surrounding wonders. The death-like stillness of the place, the solitude of the adjoining plains, the romantic beauty of the country, and the mountain itself, perforated in every part, all tend to impress the mind of the stranger with feelings quite new, and far different from those felt in viewing magnificent edifices amidst the busy haunts of man. Every thing here invites the mind to contemplation, and every surrounding object reminds it of a remote period, and a mighty people, who were in a state of high civilization, whilst the natives of our own land were barbarians living in woods and wilds.

"Conceive the burst of surprise at suddenly coming upon a stupendous temple, within a large open court, hewn out of the solid rock, with all its parts perfect and beautiful. Standing proudly alone upon its native bed, *and detatched from the neighbouring mountain by a spacious area all round,* nearly two hundred and fifty feet deep and one hundred and fifty feet broad: this unrivalled fane rearing its rocky head to a height of nearly one hundred feet—in length about one hundred and forty-five feet, by sixty-two broad—having well-formed doorways, windows, staircases to its upper floor, containing fine large rooms of a smooth and polished surface, regularly divided by rows of pillars; the whole bulk of this *immense block of isolated excavation* being upwards of five hundred feet in circumference, and, extraordinary as it may appear, having beyond its areas three handsome figure galleries or verandahs, supported by regular pillars, with compartments hewn out of the boundary scarp, containing forty-two curious gigantic figures of the Hindu mythology,—the whole three galleries in continuity, enclosing the area, and occupying the almost incredible space of nearly *four hundred and twenty feet of excavated rock;* being about thirteen feet broad all round and fourteen feet in height; while, positively, *above* these again are excavated fine large rooms. Within the court, stands Keylas the Proud, wonderfully towering in hoary majesty—a mighty fabric of rock, *surpassed by no relic of antiquity in the known world.*

This brief outline will impart to the reader some idea of the Wonders of Elora; and if these temples do not excite in the mind emotions of astonishment and delight, I have quite misunderstood my own feelings. To build the Pantheon, the Parthenon, St. Peter's, our own St. Paul's, or a Fonthill Abbey, is a task of science and labour; but we understand *how* it is done, how it proceeds, and how it is finished; but to conceive for a moment a body of men, however numerous, with a spirit however invincible, and resourses however great, attack *a solid mountain of rock*, in most parts one hundred feet high, and excavating, by the slow process of the *chisel,* a temple like the one I have faintly described, with its galleries ,or pantheon—its vast



THE WONDERS OF ELORA. See p. 105.

area, and indescribable mass of sculpture and carving in endless profusion—the work appears beyond belief, and the mind is bewildered in amazement. I think the caverned temples of Elora* far surpass, in labour, design, &c. any of the ancient buildings that have impressed our minds with admiration. 'Fonthill Abbey (says a writer in an evening paper) is indeed the first in the kingdom. The architect who conceived, and the proprietor who consented to execute so extensive a design, must have had a mind of great comprehension, great imagination, and great vigour.' Now, what would this gentleman's sentiments be were he suddenly placed among the glories of Elora? He would imagine himself in a land of enchantment, and placed among works that were not the offspring of human hands." (Captain Seeley then proceeds to describe with great minuteness every part of the building. We cannot, of course, follow him in all his details, but a few more extracts may prove not uninteresting.) "Few palaces can boast of a finer portico than this, and not one of *similar materials;* and yet it is, comparatively speaking, but a very inferior part of this grand structure. On ascending four steps we enter the great hall of the temple. Here a magnificent scene presents itself, that for some seconds rivets the beholder to the spot; massive and elegantly sculptured pillars, placed in equi-distant ranges, supporting a well-cut and smooth roof of solid rock,

> 'By its own weight made stedfast and immovable,'

having their bases in the primitive bed of rock, which forms the floor of the room, equally well-wrought with the other parts, and having a much finer polish: every part faithfully and accurately finished, and all cut into this form out of its native granite. These are the objects that arrest the ravished sight. Let us here imagine for a moment what a laborious undertaking it would appear to us, were fifty workmen placed here to excavate the roof, fifteen feet higher, the proportions and altitude of the walls and pillars to be carried on, and the number of sculptured figures to be increased in ratio with the increased height of the room. What an arduous and difficult undertaking would it appear to be thus obliged to excavate the solid rock, and fashion it, not simply into habitations and temples, but to ornament all its parts with pillars, devices, and emblems! What must have been the labour and zeal of the workmen in thus attacking a mountain formed of the firm primeval rock, and cutting *hundreds of thousands* of feet of that hard material by the aid of an iron instrument! Surely it almost exceeds belief, that the ingenuity and industry of man could carry him through such stupendous and wonderful undertakings.

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* It must be recollected that Keylas is but one out of about a dozen that are hewn out of this mountain. A range of distinct habitations and temples extend along the line, to the right and left, for more than a mile and a quarter.

> 'Ruins that efface whate'er of finish'd modern pomp can boast.'"

The great part of these excavations, however, are not ruins, but are in as perfect a state of preservation as when first formed, and will remain so for thousands of years, when our Stowes and Blenheims, or the holy fanes of York Minster and St. Paul's, are passed away. These temples are imperishable, except by the action of water, or any concussion of Nature, which nothing can withstand.

So far habitable, and even enticing, was the Great Hall of Keylas, that the gallant and enthusiastic captain intended to pass his first evening within its walls, and had his couch placed in it, with one of his Siphanees as sentry in the portico; but his courage quailed before the spirit of superstition which seemed to haunt the place. "The gloomy silence that reigned all around after nightfall became oppressively heavy. It was not that pleasing pensive melancholy that steals over the mind when viewing these wonders by daylight; it was not fear nor dread, but the imagination wrought upon by the solitariness and grandeur of the place, and of the mighty race who formed it, which led the mind back to an unknown age, with all its train of reflections on the mutability of human affairs. Surely the Brahmin could not have designed a fitter place of meditation. Nothing can be better adapted to estrange the soul from all mundane ideas than the deep gloom of these temples at the hour of midnight. Whilst thus in the pensive mood, restless, and the mind fatigued with thinking, the lines of Pope came to my aid:

> 'The sage Chaldeans robed in white appear'd,
> And Brahmans deep in desert woods revered;
> These stopp'd the moon, and called the embodied shade
> To midnight banquets in the glimmering glade;
> Made visionary fabrics round them rise,
> And airy spectres skim before their eyes.
> Of talisman and vigils knew the power,
> And careful watch'd the planetary hour.'

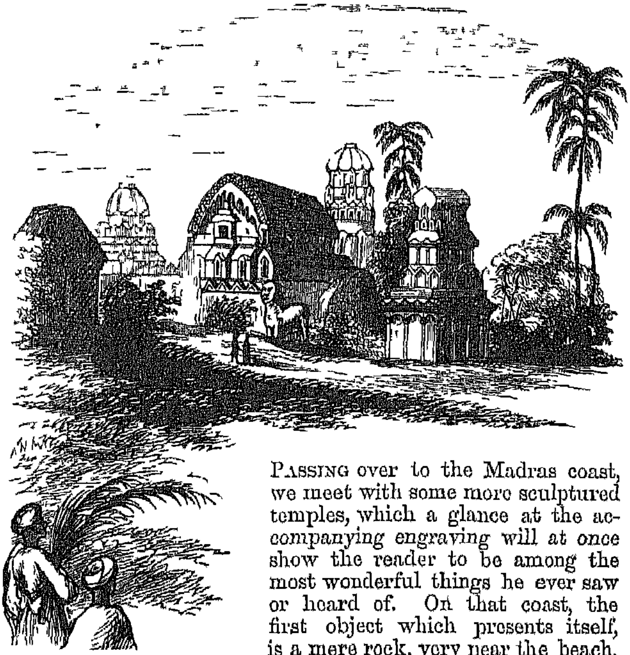
This made matters worse, so that I thought upon beating a retreat to my tent. What must be the feelings of the ignorant superstitious native who attributes all these temples to Divine origin! The Hindu votary must have been sceptical and lethargic enough who was not impressed with religious awe and superstitious fear, while offering up his orisons at these sacred shrines, acted upon by the delusions of midnight music and lights, and the fierce looking deities around; and to crown the scene of worship, the glorious canopy of heaven, with its millions of lights constantly seen from the windows of nearly all the temples. How sublimely awful must Nature here appear clothed in the terrible garb of thunder, lightning, and storms, during night in the rainy season; the lightning of the most vivid and luminous kind; the rain falling in cascades, compared to the showers of Europe; long, loud, and deep thunder, peculiar to tropical climates, reverberating through the areas and excavations of the mountain, shaking these massy tenements to their base. How fearfully grand must the scene be here during such a night at the solemn hour of midnight, heightened by the show and shouts of the most enthusiastic worship, is better conceived than described.

'Auspicious midnight, hail!
The world excluded, every passion hush'd,
And open'd a calm intercourse with heaven;
Here the soul sits in council—ponders past,
Predestines future actions; sees not—feels not
Tumultuous life, and reasons with the storm.'"

The captain "sneaked away" to his tent before morning, finding "the grandeur and gloom" of the place insupportable. We must now take our leave of him, although a "host of wonders" remain to be described in his wonderful book, from which we have taken this account of Keylas. As Seeley's enthusiam about Elora has been set down by some as mere extravagance, it may be proper to add the reports of other travellers. Colonel Fitzclarence says, "My eyes and mind are absolutely satiated with the wonders I have seen. The first are weary with objects so gigantic and extraordinary, and the latter has been so much on the stretch, being crowded and overwhelmed with ideas so overpowering and various, that I despair of ever forming any calm judgment upon them. The gross superstition, the cause of their formation, becomes even respectable and venerable, from the admiration which I experienced of these early and stupendous works of human genius—of unremitting toil and perseverance. I felt a sensation of gratitude, and almost of esteem, towards the religion which had effected a labour so immense and remarkable. The Brahmins and the Hindu nations, in their original purity, who had here concentrated their religious institutions and power, and made the very mountains subservient to their superstitions, and the various changes which had taken taken place throughout India within the last two thousand years, all passed with the velocity of a vision; and as I stood in Keylas, casting a rapid glance from those ages concealed in impenetrable darkness, in which the stupendous monuments of art before me had risen, down to the present moment, I sought in vain for any incident in the lapse of time which could convey an equal conception of the power ot man over matter." Again, speaking of the temples, the colonel says, "Some of the sculptured decorations, and the taste in the ornaments, would do credit to the best period of the Grecian school." Sir Charles Mallet observes that, "whether we consider the design or contemplate the execution of these extraordinary works, we are lost in wonder at the idea of forming a vast mountain into almost eternal mansions." And speaking of this part of the world in general, Colonel Call, chief engineer at Madras, observes, "It may be safely pronounced that no part of the world has more marks of antiquity for arts, sciences, and civilization, than the Peninsula of India, from the Ganges to Cape Comorin. I think the carvings on some of the pagodas, as well as the grandeur of the work, exceed anything executed now-a-days, not only for the delicacy of the chisel, but the expense of construction, considering in many instances to what distances the component parts were carried, and to what heights raised."

Before leaving this neighbourhood we may as well take a peep at the "unparalleled" Fort of Dowlatabad, as it is termed by *The Edinburgh Review*. It stands upon an insulated mass of granite, rising to the height of about 500 feet above the plain. For nearly one-third of the height *the rock has been scraped like a wall, and presents all round a perpendicular cliff*. Above this it assumes a pyramidical form, or that of a "compressed beehive." Four lines of walls and gates must be passed before reaching the ditch, over which is a very narrow causeway, that will not admit more than two persons abreast. "The scraped rock appearing to cut off all communication with those below, and the towers, buildings, *and trees* above, impressed me most forcibly (says Colonel Fitzclarence) with the idea of the flying island of Laputa, in Gulliver's Travels. Had I not been informed how I was to ascend the summit of the perpendicular cliff, I should have despaired of ever reaching it, as no visible means presents itself, and all is alike steep and forbidding; though one may, with an attentive eye, discover a small window, about half way up, in the face of the rock. The governor led the way through an excavation into the *heart of the rock*, so low that I was obliged to drop nearly double. But after a few paces, a number of torches showed me I was in a high vault, and we began to ascend on a winding passage, cut through the interior of the body of the hill. This passage was about twelve feet high, and the same broad, and the rise regular. At certain distances from this dismal gallery are trap-doors, with flights of small steep steps, leading to the ditch below, only wide enough to admit a man to pass, also cut through the solid rock to the water's edge. I suppose we were four or five minutes in reaching the window I had seen from below; and after resting, we continued to climb. As I observed a passage leading off from the one in which we were I followed it, and, to my surprise, found that it led back, forming a retrogressive semicircle to our road; and on the sides of it were many recesses, with shelves for depositing stores. We might have been in all ten minutes mounting by torch-light, and came out in a sort of hollow in the rock, about twenty feet square. On one side, leaning against the cliff, was a large iron plate, nearly the same size as the bottom of the hollow, with an immense iron poker. On the besiegers having gained the subterranean passage, this iron is intended to be laid down over the outlet, and a fire placed upon it. I observed a hole about three feet in diameter perforating the rock. This is meant to act as a bellows to the fire; and the current of air which came through it was so strong that I could hardly stand against it. From its strength and these precautions it is deemed impregnable. On the peak of the rock, on a stone bed, not many feet broad, stands the flag-staff and a large brass twenty-four pounder. Now, at this point, the view is most extensive and beautiful. About 100 yards from the summit, we saw a tube cut out of the rock, containing, I should think, forty hogsheads of water." It is remarkble, however, that this was one of the first fortresses in the Deccan that fell into the hands of the Mahommedans, about the close of the thirteenth century.

THE ROCK-TEMPLES OF MAVALIPURAM.



Passing over to the Madras coast, we meet with some more sculptured temples, which a glance at the accompanying engraving will at once show the reader to be among the most wonderful things he ever saw or heard of. On that coast, the first object which presents itself, is a mere rock, very near the beach, rising abruptly out of a level plain of great extent, and having at a distance the appearance of some antique lofty edifice. On coming near to the foot of the rock, sculptured images crowd so thick upon the eye, as almost to suggest the idea of a fortified town. Adjoining this, there is a pagoda, covered with sculptures, *hewn from a single mass of rock!* The top is arched like a roof, in a style of architecture different from anything now to be seen in these parts. Opposite, there is an excavated chamber *in* the rock, the roof seemingly supported by pillars, not unlike those at Elephanta. A few paces onward is another more spacious excavation.

The ascent of the rock, on the north, is at first, from its natural shape, gradual and easy, and is in other parts rendered more so by excellent steps. In the way up, a prodigious circular stone is passed under, twenty-seven feet in diameter, so placed by nature on a smooth and sloping surface, that you are in dread of its crushing you before you clear it. The top of the rock is strewed with bricks, the remains, as you are informed, of an ancient palace. A large polished slab, having two or three steps up to it, and a lion couchant at the upper end of it, is shown as the couch of Dherma Rajah. A short way further is a reservoir, excavated from the rock, with steps inside, which is called the bath of his queen Draputty. Descending thence, over the immense beds of stone, you arrive at a spacious excavated temple, filled with huge sculptures. The stone of which they are formed is a species of granite, extremely hard.

On the beach, the surf, according to the local tradition, rolls *and roars over the submerged city of the Great Bali.* "There are really (says Bishop Heber) some small remains of architecture, which rise from amid the waves, and give a proof that the sea has encroached on the land. There are also many rocks rising through the white breakers, which the fancy of the Brahmins points out as ruins; and the noise of the surf, the dark shadow of the remaining building, the narrow slip of dark smooth sand, the sky just reddening into dawn, and lending its tints to the sea, together with the remarkable desolation of the surrounding scenery,—were well calculated to make one remember with interest the description in Kahama, *and to fancy that one saw the beautiful form of Kailyal, in* her white mantle, pacing sadly along the shore, and watching till her father and her lover should emerge from the breakers."

About a mile to the southward of the hill, are two other pagodas *cut out of the rock.* One of them is about *forty feet in* height, and is covered with sculptures and inscriptions in an ancient unknown character. The other has a rent through the middle, from the top to the bottom, apparently caused by an earthquake. Here also is the lion, very large and well-executed; and near it, an elephant of stone, about nine feet in height. Some of the sculptures are unfinished; and this, with the rent just referred to, and the submerged ruins, seem to favour the idea that the work was interrupted by some violent convulsion. Of the high antiquity of these temples, there seems no reason to doubt. Several copper-plates have been dug up, dated *above a thousand years ago,* and which refer to these sculptured rocks as, *at the time, of unknown origin!*

The rock-temples of Adjunta, Baug, and Worne, are also deserving of notice; but it is impossible to describe the hundreds of such ancient marvels which are to be found in all parts of India.

THE PALMYRA OF THE DECCAN

Is the name given by Sir James Mackintosh to the ruins of Bejapoor. To trace the limits of this city, we are told, would be a day's work, so immense is the mass of ruins; but, from the innumerable tombs, mosques, and edifices of every description which it exhibits, it must have been one of the greatest cities in India. As the traveller approaches it from the north, the great dome of Mahomet Shah's tomb is discerned from the village of Kunnoor, fourteen miles distant. A nearer view gives the idea of a splendid and populous metropolis, from the innumerable domes and spires which meet the eye; and though the road up to the wall leads through ruins, the illusion of a tolerably well-inhabited capital is still preserved by the state of the walls, the guns mounted on the works, and the guards stationed at the gates. On entering, the illusion vanishes, and the most melancholy contrast is exhibited between the number and admirable state of repair of the buildings to the memory of the dead, and the total destruction of those formerly inhabited by a swarming population. Jungle has shot up and partly obliterated streets which were once thronged with a busy people in pursuit of their various avocations; and the visitor may now lose himself in the solitude of ruins, where crowds were formerly the only impediments to a free passage.

The most conspicuous object within the fort is the mausoleum of Mahomet Shah, which was forty-two years building. It is a large quadrangular structure, 150 feet square and 150 feet high; the dome is only ten feet less in diameter than the cupola of St. Peter's. The echo within, as in the whispering gallery of St. Paul's, is so perfect, that the visitor is ready to fancy it the voice of another person mimicking him. At the four corners of the tomb are octagonal minarets, about 140 feet in height. The general style of the tomb is grandeur and simplity. Outside of the fort, the mausoleum of Ibrahim II. is the most conspicuous building. On the outside, the walls are carved into Arabic inscriptions, sculptured with great skill, and disposed in every variety of ornament. A person looking at the illuminated page of a beautiful oriental manuscript, magnifying this, and fancying it to be represented by sculpture, painting, and gilding on the face of a wall of black granite, will have some conception of the labour, skill, and brilliancy of this work. *The whole of the Koran is said to be carved on the four sides of this elegant structure,* in which the utmost art and taste of the architect and the sculptor have combined to produce the richest effect.*

EPHESUS.

We pay a visit to Ephesus, in search of one of the "Seven Wonders of the World" — the Temple of Diana, celebrated both in sacred and secular story; but its magnificence has departed. All that constituted the splendour of this edifice: its columns, of which 127 were the gifts of kings; its works of art, comprising the master-pieces of Apelles and Praxiteles, have disappeared. It can now be identified only by the marshy spot on which it was erected, and by the prodigious extent and magnitude of the arches raised above as a foundation. The vaults formed by them compose a labyrinth, and pure water is knee-deep underneath. There is not an apartment entire; but thick walls, shafts of columns, and fragments of every kind are confusedly scattered.

As in the case of Solomon's Temple, the first temple was destroyed and replaced by a second still more magnificent. The original structure fell not by the rage of Xerxes, who spared it, but by the conceit of an Ephesian, who, to immortalize his name, set fire to it! The second temple was burnt by the Goths. Its destruction is thus described by Gibbon:— "In the general calamities of mankind, the death of an individual, however exalted, the ruin of an edifice, however famous, are passed over with careless inattention. Yet, we cannot forget that the Temple of Diana at Ephesus, after having risen with increasing splendour from seven repeated misfortunes, was finally burnt by the Goths in their third naval invasion. The arts of Greece, and the wealth of Asia, had conspired to erect that sacred and magnificent structure. It was admired as one of the wonders of the world. Successive empires, the Persian, Macedonian, and the Roman, had revered its sanctity, and enriched its splendour. But the rude savages of the Baltic were destitute of a taste for the elegant arts, and they despised the ideal terrors of a foreign superstition."

Besides the temple, the Stadium, the Theatre, the Odeon, and the Gymnasium, may all be distinguished in outline. It

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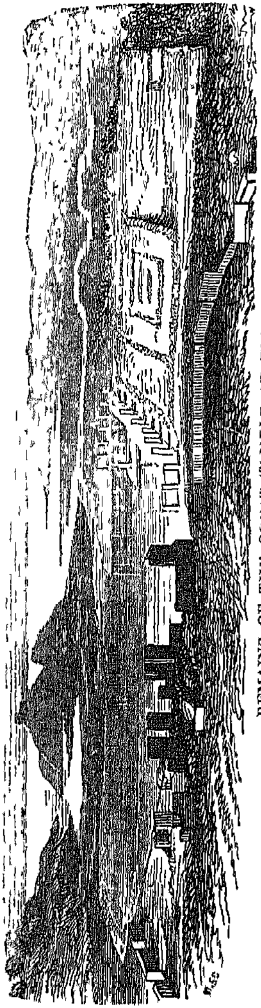
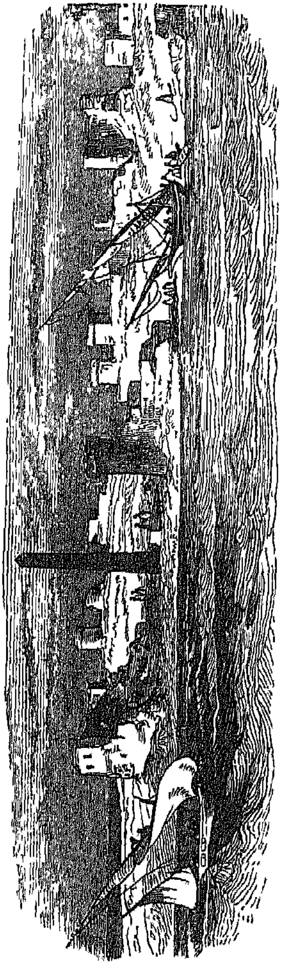
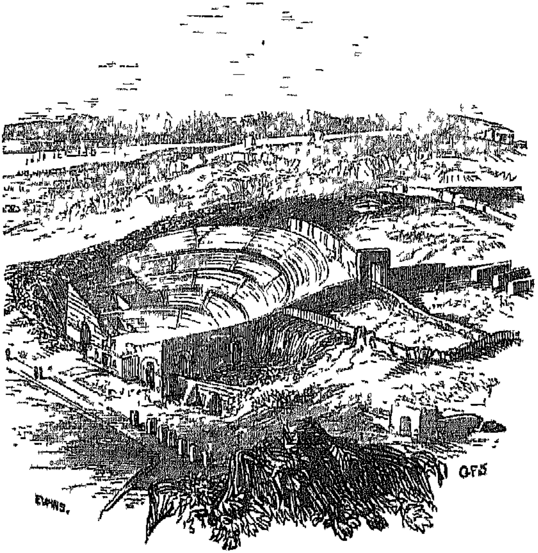
* There is a brass gun in the fort, nearly 15 feet long. It would require an iron ball weighing upwards of 2500 pounds!!



REMAINS OF THE GREAT TEMPLE AT EPHESUS.



ALEXANDRIA.



THEATRE AT EPHESUS.

was this theatre, doubtless, into which the people rushed, shouting, "Great is Diana!" when St. Paul, by his preaching, produced a tumult at Ephesus. In both wings of this theatre are several architectural fragments; and over an arch, once one of the avenues, is an inscription, enjoining the reader, "If he did not think proper to approach the festive scene, at least to be pleased with the skill of the architect, who had saved a vast circle of the theatre." The above engraving gives a view of this remnant of antiquity.

ALEXANDRIA.

Another of the old "Seven Wonders of the World," the Tower of Pharos, was at Alexandria. The ruins of it are buried in the sea, at the bottom of which, in a calm day, one may easily distinguish large columns, and several vast pieces of marble, which give sufficient proofs of the magnificence of the building in which they were anciently employed. The harbour lay in the centre of the city, and at its entrance stood the tower. It was a large square structure, built of white marble, on the top of which a fire was constantly kept burning, in order to guide ships by night.

Ancient Alexandria was a magnificent city. There was one street two thousand feet wide, adorned with houses, temples, and public buildings. Throughout the whole extent, the eye was never satiated with admiring the marble, the porphyry, and the obelisks which were destined hereafter to adorn Rome and Constantinople. This street was indeed the finest the world ever saw. The palace occupied a quarter of the city. The Temple of Serapion, Ammianus Marcellinus assures us, surpassed all the temples then in the world for beauty and magnificence, with the sole exception of the Capitol at Rome. Here also was the famous library, containing 700,000 volumes, which was destroyed by the Saracens. Amron, who captured it, thus wrote to his master, the caliph of Omar: "I have taken the great city of the West. It is impossible for me to enumerate the variety of its riches and beauty; I shall content myself with observing, that it contains 4000 palaces, 4000 baths, 460 theatres, 12,000 shops for the sale of vegetable food, and 40,000 Jews."

The present state of Alexandria affords a scene of magnificence and desolation. In the space of two leagues, inclosed by walls, nothing is seen but the remains of pilasters, of capitals, and of obelisks, and whole mountains of shattered columns and monuments of ancient art, heaped upon one another, and accumulated to *a height even greater than that of the houses.*

According to Sonnini, "columns subverted and scattered about; mutilated statues; and fragments of every species overspread the ground. It is the hideous theatre of destruction the most horrible. The soul is saddened on contemplating those remains of grandeur and magnificence; and it is raised into indignation against the barbarians who dared to apply a sacrilegious hand to monuments which time, the most pitiless of destroyers, would have respected."

TYRE.

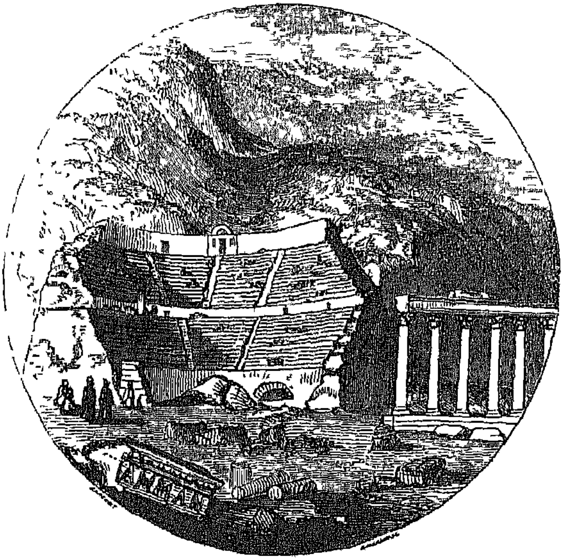
HAVING included in our list of Wonderful Cities now in ruins, Nineveh and Babylon, we cannot omit Tyre. According to Herodotus, it was founded about 2760 years before the Christian era, and was at one time the greatest maritime city in the world. The buildings were spacious and magnificent; above all, the temples of Jupiter, Hercules, and Astarte. The walls were 150 feet high, proportionably broad, and firmly built with huge blocks of stone. Its munificence and wealth are described with great splendour of language by the prophet Ezekiel (chap. xxviii).

Tyre produced from Hermon, and the mountains near it, fir for planking, and from Libanus, cedars for masts; from Bashan, oaks for oars; from Greece, ivory to adorn the benches of the galleys; from Egypt, linen, ornamented with different colours, for sails, or flags, or ensigns; from Peloponnesus, blue and purple cloths for awnings; from Sidon and Aradus, mariners; from Gebal, caulkers; from Persia and Africa, mercenary troops; from Tarshish, iron, tin, lead, and silver; from Greece, and the countries bordering on Pontus, slaves and brass-ware; from Armenia, horses, horsemen, and mules; from the Gulf of Persia, ivory; from Syria, emeralds, purple broidered work, fine linen, coral, and agate; from Judah and Israel, the finest honey, wheat, oil, and balsam; from Damascus, wine and wool; from Philistia, bright or wrought iron, cassia or cinnamon; from the Gulf of Persia, rich cloth for the decoration of chariots or horsemen; from Arabia, rams, and lambs, and goats; from Sabea, the best of spices; from *India, gold and precious stones; from Mesopotamia and Baby*lonia, the Assyrians brought all sorts of exquisite things.

The luxury, vice, and destruction of this mighty city, which once had the entire controul of the trade with India, and into whose lap the treasures of the world were poured, are described by the Hebrew prophets; and we are told by modern travellers that its desolation is now complete. Messrs. Fisk and Jowett, missionaries, were there in the autumn of 1823, and the former describes the town and harbour as environed by rocks, on the ledges of which are scattered in every direction the fragments of ancient columns. They counted not less than 100 columns in one place on the rocks, and some ten or fifteen under water, showing that the waves of the sea now roll where once stood the vast and magnificent palaces of Tyrian wealth and luxury.

THE ACROPOLIS OF AMMON.

THE "royal city" of the Ammonites was famous in the days of David, king of Israel, who captured it. Its Acropolis, long its chief stronghold, is still conspicuous among its ruins. It stands, as described by Lord Claud Hamilton, "on an isolated hill to the north of the town. Its walls are high, very well built, and in many parts in good preservation. The chief ruins are those of a temple, which was once adorned with a portico and peristyle of grand Corinthian columns, all now prostrate; but their massive remains attest their former magnificence. The great theatre (there is another smaller) is a grand edifice;



RUINS OF THE AMMON AMPHITHEATRE.

it is scooped out of the side of the hill, being partly composed of the living rock, but chiefly of masonry. This theatre must have been intended for games and other exercises in the open air, and, instead of the enclosed passages and covered chambers behind the stage, there is only an open colonnade of handsome Corinthian columns, which extends from one extreme to the other of the rows of seats. Within the colonnade is an extensive arena of a horseshoe form, 128 feet from seat to seat. Forty-three rows of seats extend a great height, and are separated into three tiers by broad landing-places; seven radii of smaller steps admitted the spectators to their several seats. The remains of one grand temple are sufficient to attest its former magnificence, surrounded as it was by lofty columns, some of which are still entire. Adjoining is a little fane, divided into square apartments, each containing a variety of rich and elegant ornaments; and an open arch, which forms the centre, has the most beautiful carved ceiling I ever saw."

STONEHENGE.

THIS is the name given to an assemblage of upright and prostrate stones on Salisbury Plain, supposed to be the remains of an ancient Druidical temple. Next to the Pyramids of Egypt, Stonehenge, and other remains of the same class, rank among the most remote and most wonderful monuments of antiquity. They are all anterior to history, and consequently involved in the deepest mystery. Hence, also they have occasioned much speculation, and many volumes have been written with a view of explaining the origin and uses of such structures. In this short sketch, it is intended to describe clearly and explicitly what Stonehenge is, and what it has been. No relic of antiquity in Great Britain has excited more surprise and curiosity. To behold this "wonder of the west," as it has been termed, with interest and satisfaction, it should be viewed with an artist's eye, and contemplated with a mind stored with antiquarian and historical knowledge.

Dr. Stukeley remarks of it, writing in 1743, "Stonehenge stands not upon the summit of a hill, but pretty near it; and for more than three-quarters of the circuit you ascend to it very gently from the lower ground; at half a mile distance its appearance is very stately, awful, and august; as you advance nearer, especially up the avenue, which is now most perfect, the greatness of its contour fills the eye in an astonishing manner."

Stonehenge is enclosed within a circular ditch; after passing which the visitor ascends thirty-five yards before he comes to the work itself. Upon entering the building, and casting the eye round upon the yawning ruins, the mind is impressed with a sense of wonder which none can describe, and they only can be sensible of, who have felt it. Other buildings fall by piecemeal, but here a single stone is a ruin, and lies like the haughty carcase of a Goliah. Yet there is as much of it undemolished as enables us sufficiently to recover its form in its perfect state. When we advance farther, the dark part of the ponderous imposts over our head, the chasm of sky between the joints of the cell, the singular construction of the whole, and the greatness of every part, excite renewed feelings of astonishment.

All writers who allude to the remarkable temple on Salisbury Plain speak of its gigantic and imposing effect as producing on their minds mingled impressions of surprise and awe. Yet it is hardly necessary to remind the reader that it is a mere wreck of what it once was, when its circles were complete, and its huge masses stood poised in air. Portions of it have fallen at a recent period, and slow as the work of destruction progresses, it is vain to hope that this has the elements of perpetual endurance in it more than any other work of man's hands. The following account of the sudden fall of two of the largest columns, towards the close of the last century, is contained in a letter from Dr. Manton: "On the 3rd of January, 1797, some people employed at plough, full half a mile distant from Stonehenge, suddenly felt a concussion or jarring of the ground, occasioned, as they afterwards perceived, by the fall of two of the largest stones and their impost. That the concussion should have been so sensible will not appear incredible, when I state the weight of these stones. A cubic inch of the substance of which the stones are composed, weighing one ounce six pennyweights, the ponderosity of the entire trilithon will be found to be nearly seventy tons. The impost alone is considerably more than eleven tons in weight. This stone, which was projected about two feet beyond the supporters, made an impression in the ground to the depth of seven inches or more."

When perfect, it had consisted of two outer concentric circles of stones, with two inner groups of stones. The outer circle appears to have consisted of thirty upright stones, seventeen of which are still standing; their average height is fourteen feet, and their sides seven feet by three feet. The inner circle consists of smaller stones more irregularly shaped than those on the outer circle, and without imposts; only eight stones of this circle are now standing, but there are remains of twelve others on the ground. Within the inner circle are two groups of stones having between them a large flat stone, called the *altar*. Some of these interior stones are of vast size, and have imposts similar to those of the outer circle. According to what appears to be the most accurate calculation, Stonehenge, when entire, must have comprised in all, 129 or 130 stones. They consist mostly of a fine, white, compact sandstone.

Such is a brief notice of this stupendous monument. Similar remains are to be found at Avebury, in the vicinity, and in various places in Brittany, the Orkney Islands, &c. The general opinion is, that they were Druidical temples: but this is mere conjecture. On Stonehenge, Sir R. Hoare remarks, in his "History of Ancient Wiltshire,"—"I cannot for a moment hesitate in declaring it neither Roman, Saxon, nor Danish. We learn from the Holy Scriptures that the earliest memorials were of stone; and we find, to this day, single, double, and triple upright stones, as well as numerous circles dispersed about our dominions: we thus find some attempts at architecture in the Cromlech and Kistvaen, in both of which we see immense stones laid incumbent upon others that are upright: whether these gave the idea of the imposts at Stonehenge, or *vice versa*, will be a difficult matter to determine: at all events, I consider Stonehenge of a much more modern date than Avebury, where there are no imposts, and no marks of working on the stones; but in the former we perceive a regular plan, a great deal of symmetry, and great knowledge in mathematics. We know, also, that many stone monument exist on the continent, and in that part of it from whence our island probably received its, earliest population, viz., *Gallia-Celtica*. The most remarkable of these monuments is situated in the village of Carnac, on the western coast of Bretagne. Some detached stones on the hills and sand-banks announce the approach to this grand theatre, which consists of an immense number of rude unhewn stones (amounting to 4000 or more) standing in an upright position, on a sandy plain, near the sea-coast. They are ranged in eleven straight lines, which lines are separated from each other by a space of thirty or thirty-five feet and the distance from one stone to another varies from twelve to fifteen feet. The highest of these stones measures *twenty-two feet out of ground;* the width varies; one of them is twenty-two feet high, twelve feet wide, and six feet thick; and many of them are movable. These stones present the most singular aspect; they stand alone on an extensive plain, attended only by the sand that supports them, and the vault of heaven that surrounds them; not an inscription to explain, nor an analogy to inform. They recall to our memory those times which neither our calculation nor our history can ever attain.

I have before stated my opinion, that our earliest inhabitants were Celts, who naturally introduced with them their own buildings, customs, rites, and religious ceremonies; and to them I *attribute the erection of Stonehenge, and the greater part of* the sepulchral *memorials that still continue to render its en*virons so truly interesting to the antiquary and historian.

This theory seems the most probable, though not the one most generally entertained. As Wordsworth says,

Darkness surrounds us; seeking, we are lost
On Snowden's wilds, amid brigantine coves,
Or where the solitary shepherd roves
Along the plain of Sarum, by the ghost
Of Time and shadows of Tradition crost;
And where the boatman of the Western Isles
Slackens his course——to mark those holy piles
Which yet survive on bleak Iona's coast.
Nor these, nor monuments of oldest fame,
Nor Taliesin's unforgotten lays,
Nor characters of Greek or Roman name,
To an unquestionable Source have led.
Enough—if eyes that sought the fountain-head in vain,
In vain upon the growing rill may gaze.

RUINS OF YUCATAN.

MR. STEPHENS, the celebrated traveller, after exploring Central America, had his attention drawn to Yucatan, by accounts he received of ancient ruins of great extent which lay buried in the vast forests with which nearly the whole country is covered. In the interesting narrative of his travels he gives an account of visits made to forty-four ruined cities, many of them containing extensive remains of temples and palaces still covered with sculptures, and frequently adorned both with paintings and hieroglyphics. His work is adorned with numerous engravings of these gigantic memorials of an extinct race, large views of the ruined temples and palaces, curious representations of sculptures, hieroglyphic inscriptions, and many of the very singular national features peculiar to that remarkable country, to which the Spaniards of the fifteenth century were lead by Columbus, although he himself never reached the mainland of the New World. Columbus never doubted that he had discovered in the island of Cuba a land of ancient fame, which he believed to be that of Ophir, from whence Solomon obtained the store of gold with which he adorned the temple of Jerusalem. The natives still pointed toward the west, "and well would it have been (says Washington Irving) had he followed their advice. Within a day or two he would have arrived at Yucatan; the discovery of Mexico and the other opulent countries of New Spain would have necessarily followed. The Southern Ocean would have been disclosed to him, and a succession of splendid discoveries *would have shed fresh glory on his declining age, instead of* its sinking amid gloom, neglect, and disappointment."

Yucatan was, however, duly discovered and conquered by the Spaniards. The inhabitants fought with extraordinary courage, but their resistance proved unavailing against the superior skill of European warfare; and now the gigantic and mysterious ruins which we are about to describe alone attest their power and magnificence.

One of the most remarkable groups of ruins explored by Mr. Stephens and his companions was that of Uxmal; and the first of these singular relics which they examined is called by the present natives the *Casa del Gubernador*, or House of the Governor. "This building was constructed entirely of stone. Up to the cornice, which runs round it the whole length, and on all four of its sides, the façade presents a smooth surface; above is one solid mass of rich, complicated, and elaborately-sculptured ornaments, forming a sort of arabesque. The grandest ornament, which imparts a richness to the whole façade, is over the centre doorway. All the other doorways have over them striking, imposing, and even elegant decorations. The part immediately over the doorway shows the remaining portion of a figure seated on a kind of throne. The head-dress is lofty, and from it proceeded enormous plumes of feathers, divided at the top, and falling symmetrically on each side, until they touch the ornament on which the feet of the statue rest. Each figure was perhaps the portrait of some cacique warrior, prophet, or priest, distinguished in the history of this unknown people. At this day the Indians believe these old buildings are haunted, and that all the ornaments are animated and walk at night. I have no doubt that all these ornaments have a symbolical meaning; that each stone is a part of an allegory, history, or fable, hidden from us, but which, if ever revealed, will show that the history of the world yet remains to be written."

The rear elevation of the Casa del Gubernador is a solid wall, without any doorways or openings of any kind. Within are two parallel ranges of rooms, each range numbering as many rooms as there are doorways in the front wall, through which alone they receive the light, each back-room communicating with the corresponding front-room by a door immediately opposite the outer one. The height of this, as of all the other ruined buildings, does not correspond with the imposing breadth of the façade, it being little more than twenty-four or twenty-five feet. Apparently, the lintels of the doors have all been of wood, and some were still in their places, and in good condition, when examined by Mr. Stevens. This, however, is no proof against the antiquity of the buildings, as these beams are of a very hard wood, which, it is said, does not grow in the neighbouring forests, but must have been transported hither from the forests near the lake of Peten, a distance of about three hundred miles. From the manner in which the sculptured ornaments on the exterior of the buildings cover the stones—the several parts of one design occupying several adjoining stones—it is evident that these must have been placed in the wall before they were sculptured.

But though not of great height itself, this building, like all of the same sort among these ruins, occupies an elegant position, being the upper platform of an artificial sub-structure, which rises in three terraces from the level plain, and which, notwithstanding its great dimensions, bears evidence of being the work of man. The first terrace is 575 feet long, 3 feet high, and 15 feet broad; the second is 545 feet long, 20 feet high, and 250 feet wide; the third, on which stands the stately edifice, is 360 feet long, 19 high, and 30 broad. In the centre of the platform of the second terrace commences a flight of steps 130 feet wide, and leading up to the third terrace immediately in front of the house, the façade of which is 322 feet long.

On the terrace below that on which stands the Casa del Gubernador is the Casa de las Tortugas, or House of the Tortoises, so called from the form of the stones with which the rectangular court enclosed within its four wings was paved. These stones are described as being each six inches square, exquisitely cut in semi-relief with the full and accurate figure of a tortoise, and as being arranged in groups of four, with the heads of the tortoises together. The number required to cover the surface of the court is said to have been 43,660 feet.

Another singular building is called the House of the Dwarf, and sometimes the House of the Diviner, from its overlooking the whole city, and enabling its occupant to be cognizant of all that was passing around him. The court-yard of this building is 135 feet by 85 feet. It is bounded by ranges of mounds from 25 feet to 3 feet thick. In the centre is a large circular stone, called the Whipping Post, similar to what are to be found elsewhere in these ruined cities. The base of the house is 235 feet long and 155 feet wide. Its height is 88 feet, and to the top of the building it is 105 feet. Though diminishing as it rises, its shape is not exactly pyramidal, but its ends are rounded. It is encased with stone, and apparently solid from the plain. At the height of 60 feet is a solid projecting platform, on which stands a building loaded with ornaments more rich, elaborate, and carefully executed, than those of any other edifice in Uxmal. A great door-way opens upon the platform. The steps or other means of communication with this building are entirely gone, and at the time of our visit we were at a loss to know how it had been reached; but from what we saw afterward, we are induced to believe that a grand staircase, upon a different plan from any yet met with, and supported by a triangular arch, led from the ground to the door of the building, which, if still in existence, would give extraordinary grandeur to this great mound. The front of the structure which crowns this mound is much ruined, but even in its decay presents the most elegant and tasteful arrangement of ornaments to be seen in Uxmal. The emblems of life and death appear on the wall in close juxta-position, confirming the belief in the existence of that worship practised by the Egyptians and all other Eastern nations."

The peculiar characteristics of nearly all the remains of ancient sculpture and architecture in Yucatan are a barbarous magnificence, and indefinite grandeur, as if the ideas of the designer had been superior to his powers of execution; yet mingled with these are many traces of skilful and artistic design. At Kabah, for example, another very extensive group of ruins, Mr. Stephens was struck with some remarkably rich architectural details, which he thus describes:—"In the centre of the platform is a range of stone steps 40 feet wide, and 20 in number, leading to an upper terrace, on which stands the building. This building is 151 feet in front, and the moment we saw it we were struck with the extraordinary richness and ornament of its façade. In all the buildings of Uxmal, without a single exception, up to the cornice which runs over the doorway, the façades are of plain stone; but this was ornamented from the very foundation, two layers under the lower cornice, to the top. The cornice running over the door-ways, tried by the severest rules of art recognised among us, would embellish the architecture of any known era; and, amid a mass of barbarism, of rude and uncouth conceptions, it stands as an offering by American builders worthy of the acceptance of a polished people."

Mr. Stephens also saw at Kabah a lonely arch. "It stands on a ruined mound, disconnected from any other structure, in solitary grandeur. Darkness rests upon its history, but in that desolation and solitude, among the ruins around, it stood like the proud memorial of a Roman triumph. Perhaps like the arch of Titus, which at this day spans the Sacred Way at Rome, it was erected to commemorate a victory over enemies."

One of these ruined palaces represents a pyramidal mound, "Holding aloft (says Stephens) the most curious and extraordinary structure we had seen in the country. It put us on the alert the moment we saw it. We passed an entire day before it, and in looking back upon our journey among ruined cities, no subject of greater interest presents itself to my mind. With the full blaze of a vertical sun upon it, the white stone glared with an intensity dazzling and painful to the eyes, and almost realising the account by Bernal Dias in the expedition to Mexico, of the arrival of the Spaniards at Cempool. 'Our advanced guard having gone to the great square, the buildings of which had lately been whitewashed and plastered, in which art these people are very expert, one of our horsemen was so struck with the splendour of their appearance in the sun, that he came back at full speed to Cortez, to tell him that the walls of the houses were of silver.'"

Above the cornice of the building rises a gigantic perpendicular wall to the height of 30 feet, once ornamented from top to bottom, and from one side to the other, with colossal figures and other designs in stucco; now broken and in fragments, but still presenting a curious and extraordinary appearance, such as the art of no other people ever produced. In a few years it must fall. Human power cannot save it; but in its ruins it gave a grand idea of the scenes of barbaric magnificence which this country must have presented when all her cities were entire.

The figures and ornaments on this wall were painted; the remains of bright colours are still visible, defying the action of the elements. If a solitary traveller from the Old World could by some strange accident have visited this aboriginal city when it was yet perfect, his account would have seemed more fanciful than any in Eastern story."

What is very wonderful in regard to all these cities is, the absence of all evidence of work-shops or commerce of any kind. And it seemed at first, too, as if they had been destitute even of wells, and such things as are absolutely necessary to the sustenance of life; but, in this respect, art had triumphed over the deficiencies of nature in a singular manner. Deep cavernous wells were discovered in various places, one of which we shall now permit Mr. Stephens to describe:—"Returning in the same direction, we entered a thick grove—the finest we had seen in the country—and within it was a great circular cavity, twenty or thirty feet deep, with trees and bushes growing out of the bottom and sides, and rising above the level of the plain. It was a wild-looking place, and had a fanciful, mysterious, and almost fearful appearance; for while in the grove all was close and sultry, and without a breath of air, and every leaf was still, within this cavity the branches and leaves were violently agitated, as if shaken by an invisible hand. This cavity was the entrance to the well, and its appearance was wild enough to bear out the wildest accounts we had heard of it. We descended to the bottom. At one corner was a rude natural opening in a great mass of limestone rock, low and narrow, through which rushed constantly a powerful current of wind, agitating the branches and leaves in the area without. This was the mouth of the well, and on our first attempting to enter it, the rush of wind was so strong that it made us fall back gasping for breath. Our Indians had for torches long strips of the castor-oil plant, which the wind only ignited more thoroughly, and with these they led the way. The entrance was about three feet high, and four or five wide. It was so low that we were obliged to crawl on our hands and feet. The wind, collecting in the recesses of the cave, rushed through this passage with such force that we could scarcely breathe; and as we all had in us the seeds of fever and ague, we very much doubted the propriety of going on, but curiosity was stronger than discretion, and we proceeded. In the floor of the passage was a single track, worn two or three inches deep by long-continued treading of feet, and the roof was incrusted with a coat of smoke from the flaring torches. At the distance of 150 or 200 feet, the passage enlarged to an irregular cavern, forty or fifty feet wide, and ten or fifteen high. We no longer felt the rush of cold wind, and the temperature was sensibly warmer. The sides and roof were of rough broken stone, and through the centre ran the same worn path. From *this passage others branched* off to the right and left, and in passing along it the Indians held down their torches to a block of *sculptured stone*. Beyond this we passed into a large circular opening. Here the Indians stopped and flared their torches. It was a great vaulted chamber of stone, with a high roof supported by enormous stalactite pillars. The effect under the torch-light, and heightened by the wild figures of the Indians, was grand, and almost repaid us for all our trouble. Farther on we climbed up a high, broken piece of rock, and descended again by a low, narrow opening, through which we were obliged to crawl, and which, from its own closeness, and the heat and smoke of the torches, and the labour of crawling through it, was so hot that we were panting with exhaustion and thirst. This brought us to a rugged perpendicular hole, three or four feet in diameter, with steps, barely large enough for a foothold, worn in the rock. We descended with some difficulty, and at the foot came out upon a ledge of rock, which ran up on the right to a great height, while on the left was a deep, yawning chasm. *A few rude logs were laid along the edge of this chasm, which with a pole for a railing served as a bridge, and with the torch-light thrown into the abyss below, made a wild crossing-place.* The passage then contracted, and descended rapidly. We were again obliged to betake ourselves to crawling, and again the heat became insufferable. Indeed we went on with some apprehensions. To faint in one of those narrow passages, so far removed from a breath of air, would be almost to die there.

This passage continued forty or fifty feet, when it doubled on itself, still contracted as before, and rapidly descending. It then enlarged to a rather spacious cavern, and took a south-west direction, after which there was another perpendicular hole leading, by means of a rude, ricketty ladder, to a steep, low, crooked, and crawling passage, descending, until it opened into a large broken chamber, at one end of which was a deep hole or—BASIN OF WATER!"

This account may not be perfectly accurate in all the details, but it is not exaggerated. The truest and most faithful description that could be given of it would be really the most extraordinary.

The water was in a deep, stony basin, running under a shelf of overhanging rock, with a pole laid across on one side, over which the Indians leaned to dip it up with their calabashes; and this alone, if we had wanted other proof, was confirmation that the place had been used as a well. But at the moment it was a matter of very little consequence to us whether any living being had ever drunk from it before; the sight of it was more welcome to us than gold or silver. We were dripping with sweat, black with smoke, and perishing with thirst. It lay before us in its stony basin, *clean and inviting, but it was* completely out of reach; the basin was so deep that we could not reach the water with our hands, and we had no vessel of any kind to dip it out with. In an hour and a half from the time of penetrating, we emerged into the outer air.

As a mere cave, this was extraordinary; but as *a well or watering-place for an ancient city, it was past belief, except for the proofs under our own eyes. Around it were the ruins of a city without any other visible means of supply.* And a strong circumstance to induce the belief that it was once used by the inhabitants of a populous city, is the deep track worn in the rock. For ages the region around has been desolate, or occupied only occasionally by a few Indians. Their straggling footsteps would never have made that deep track. It could only have been made by the constant and long-continued tread of thousands. *It must have been made by the population of a city* '

Another of these extraordinary wells will again be described by Mr. Stephens:—"At the distance of half a league from the village, we turned off by a well-beaten path, and descending gradually, reached the foot of a rude, lofty, and abrupt opening, under a ledge of over-hanging rock, seeming a magnificent entrance to a great temple for the worship of the God of Nature. We disencumbered ourselves of superfluous apparel, and, following the Indian, each with a torch in hand, entered a wild cavern, which, as we advanced, became darker. At the distance of 60 paces the descent was precipitous, and we went down by a ladder about 20 feet. Here all light from the mouth of the cavern was lost, but we soon reached the brink of a great perpendicular descent, to the very bottom of which a strong body of light was thrown from a hole in the surface—a perpendicular height of 210 feet. As we stood on the brink of this precipice, under the shelving of an immense mass of rock, seeming darker from the stream of light thrown down the hole, the gigantic stalactites of huge blocks of stone assumed all manner of fantastic shapes, and seemed like monstrous animals or deities of a subterranean world.

"From the brink on which we stood, an enormous ladder, of the rudest possible construction, led to the bottom of the hole. It was between 70 and 80 feet long, and about 12 feet wide, made of the rough trunks of saplings lashed together lengthwise, and supported all the way down by horizontal trunks braced against the face of the precipitous rock. The ladder was double—very steep—seemed precarious and insecure, and confirmed the very worst accounts we had heard of the descent into this remarkable well.

Our Indians began the descent, but the foremost had scarcely got his head below the surface, before one of the rounds slipped, and he only saved himself by clinging to another. With an occasional crash and slide, we all reached the foot of the ladder. Looking up, the view of its broken sides, with the light thrown down from the orifice above, was the wildest that can be conceived. As yet the reader is only at the mouth of this well; but to explain to him briefly its extraordinary character, I give its name, which is Xtacumbi Xunau. The Indians understand by this La Senora escondida, or the 'Lady hidden away;' and it is derived from a fanciful story that a lady stolen from her mother was concealed by her lover in this cave. At the foot of the ladder there is an opening in the rock, entering by which, we soon came to an abrupt descent, down which was another long and trying ladder. It was laid against the broken face of the rock, not so steep as the first, but in a much more ricketty condition; the rounds were loose, and the upper ones gave way on the first attempt to descend. At the foot of this ladder was a large cavernous chamber, from which passages diverged. Moving on by a slight ascent over the rocks, at the distance of about 75 feet, we came to the foot of a *third ladder*, and so on to the *seventh*—the length and general appearance of which induced us to pause and consider. It was laid on a narrow sloping face of rock, protected on one side by a perpendicular wall, but at the other end open and precipitous. Holding by the side of the ladder next the rock, we descended, crashing and carrying down the loose rounds, so that when we got to the bottom, we had cut off all communication with Albino; he could not descend, and what was quite as inconvenient, we could not get back. It was now too late to reflect, we told Albino to throw down our torches, and go back for Indians and ropes to haul us out. In the meantime we moved on by a broken, winding passage, and at the distance of about 200 feet, came to the top of a ladder eight feet long, at the foot of which we entered a low and stifling passage; and crawling along this on our hands and feet, at the distance of about 300 feet, *we came to a rocky basin full of water!*

"Before reaching it one of our torches went out, and the other was then expiring. We were then 1400 *feet from the* *mouth of the cave*, and at a perpendicular depth of 450 feet. We were black with smoke, grimed with dirt, and dripping with perspiration. Water was the most pleasant spectacle that could greet our eyes; but it did not satisfy us to drink it only, we wanted a more thorough benefit. Our expiring torch warned us to forbear, for in the dark we might never be able to find our way back to upper earth; but, trusting that if we did not reappear in the course of the week, Mr. Catherwood would come to the rescue, we whipped off our scanty covering, *and stepped into the pool!* It was just large enough to prevent us from interfering with each other, and we achieved a bath *which, perhaps, no white man ever before took at that depth under ground.*

The Indians call this basin Chacka, which means red water; but this we did not know at the time, and we did not discover it, for to economize our torch we avoided flaring it, and it lay on the rock like an expiring brand, admonishing us that it was better not to rely wholly upon our friends in the world above, and that it would be safe to look out for ourselves. Hurrying out, we made a rapid toilet, and, groping our way back, with our torch just bidding us farewell, we reached the foot of the broken ladder, and could go no further. Albino returned with Indians and ropes. We hauled ourselves up, and got back to the open chamber from which the passages diverged; and here the Indians pointed out another, which we followed till it became *lower than any we had yet explored;* and, according to Dr. Cabot's measurement, at the distance of 401 paces, we came to *another basin of water.* This, as we afterwards learned, is called Pucuelha, meaning that it *ebbs and flows like the sea.* The Indians say that it recedes with the south wind, and increases with the north-west. In returning we turned off twice by branching passages, and reached two other basins of water; and when we got back to the foot of the great staircase, exhausted and almost worn out, we had the satisfaction of learning that there were seven in all, and that we had missed three. All have names given to them by the Indians, two of which I have already mentioned. The third is called Sallab, which means a spring; the fourth, Akahba, on account of its darkness; the fifth Chocohá, from the circumstance of its being always warm; the sixth Ociha, from being of a milky colour; and the seventh Chimaisha, because it has insects called *ais.*

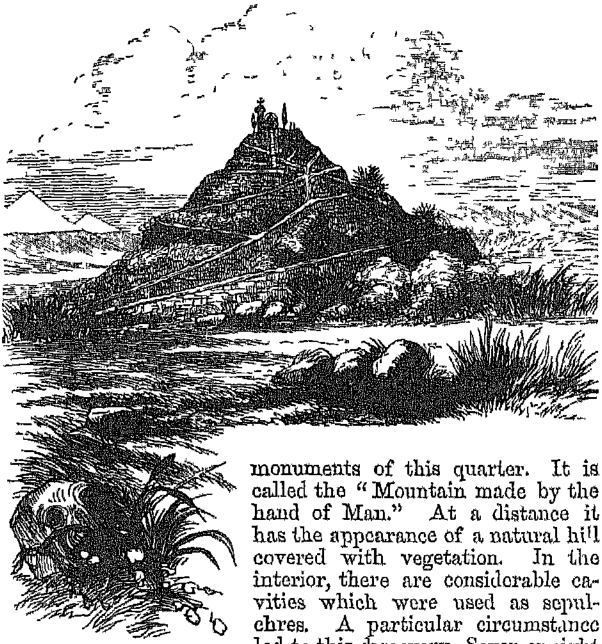
When the reservoirs in the plazza fail, the whole village still turns to this cave, and four or five months in the year derives from this source its only supply. *It is the sole and only water-*

ing-place of one of the most thriving villages in Yucatan, containing a population of 7000 *souls;* and perhaps even this is surpassed in wonder by the fact that, though for an unknown length of time, and through a great portion of the year, files of Indian men and women are going out every day with cantaros on their backs, and returning with water; and though the fame of the cave extends throughout Yucatan, from the best information we could procure, not a white man in the village had ever explored it."

THE PYRAMIDS OF MEXICO.

FROM the Old World to the New, there to meet with monuments as old possibly as the oldest of any which we have yet anywhere encountered. Though the Pyramids of Egypt are generally spoken of in such a way as to give the impression that such structures were peculiar to Egypt, this is far from being the case. There are numerous pyramids of various sizes in Arabia. The Birs-Nimroud, or supposed Tower of Babel, was a pyramidal building. India, in like manner, furnishes examples of similar structures. But next to the Great Pyramid of Gizeh, those of Spanish America are most calculated to excite attention. Like those of Babylon, the Mexican pyramids are chiefly constructed of bricks. The Great Pyramid of Cholula covers an area *more than three times* the base of the Great Pyramid of Gizeh; but it is built in the usual form of the Mexican pyramids, consisting of four receding platforms, each of which is subdivided into a number of small steps, and the top is left as a large open platform, so that the height is small compared with the base. Here, however, nearly all resemblance to the pyramids of Egypt ceases, though internal chambers have been discovered in some of them, containing skeletons, and having perhaps a monumental character. The Pyramids of Cholula appear to have been chiefly designed by the ancient Mexicans as pedestals for the statues of their gods. When Cortez first beheld them, a colossal statue occupied the summit of each, covered with plates of gold, which, however, did not long retain its position. The lofty terrace of the great pyramid was chosen as the site of a church, and mass is now daily celebrated in it by an Indian priest.

It is described by Humboldt as "the greatest, most ancient, and most celebrated of the whole of the pyramidal



monuments of this quarter. It is called the "Mountain made by the hand of Man." At a distance it has the appearance of a natural hill covered with vegetation. In the interior, there are considerable cavities which were used as sepulchres. A particular circumstance led to this discovery. Seven or eight years ago, in tracing the road from Puebla to Mexico, the first storey was cut through, so that an eighth part remained isolated like a heap of bricks. In making this opening a square house was discovered in the interior of the pyramid, built of stone, and supported by beams made of the wood of the deciduous cypress. The house contained two skeletons, idols in basalt, and a great number of vases curiously varnished and painted. No pains were taken to preserve these objects, but it is said to have been carefully ascertained that this house, covered with bricks and strata of clay, *had no outlet*. We examined the remains of this subterraneous house, and observed a particular arrangement of the bricks, tending to diminish the pressure made on the roof. The natives being ignorant of the manner of making arches, placed very large bricks horizontally, so that the upper course should pass beyond the lower. The continuation of this kind of stepwork served in some measure as a substitute for the Gothic vault, and similar vestiges have been found in several Egyptian edifices. An adit dug through the pyramid to examine its internal structure, would be an interesting operation; and it is singular, that the desire of discovering hidden treasure has not prompted the undertaking."

The Indians preserved many strange traditions, some of which pointed to the Great Pyramid as a temple for a divine being, whom they regarded as the conductor of their race to that country, and their instructor in the metallurgic arts. Another very remarkable tradition still exists among the Indians, which Humboldt, after his return to Europe, found corroborated by the Mexican MS. in the Vatican at Rome. "Before the great inundation which took place 4800 years after the creation of the world, the country of Anahuac was *inhabited by giants. All those who did not perish were transformed* into fishes, save seven, who fled into caverns. When the waters subsided, one of these giants, Xelhua, surnamed the architect, went to Cholula, where, as a memorial of the mountain Tlaloc, which had served as an asylum for himself and his six brethren, he built an artificial hill in the form of a pyramid. He ordered bricks to be made at the foot of the Sierra of Cocotl, and to convey them to Cholula, he placed a file of men, who passed them from hand to hand. The gods beheld with wrath this edifice, the top of which was to reach the clouds. Irritated at the daring attempt of Xelhua, they hurled fire on the pyramid. Numbers of the workmen perished; the work was discontinued, and the monument was afterwards dedicated to the god of the air. This tradition reminds us of those ancient traditions of the East, which the Hebrews have recorded in their sacred books. These pyramids were at once temples and tombs. The plain on which were built the houses of the Sun and of the Moon at Teohihuaca, is called the *Path of the Dead;* but the essential part of a pyramid was the chapel, the *naos*, at the top of the edifice. In the infancy of civilization, high places were chosen by the people to offer sacrifices to the gods. The first altars, the first temples, were erected on mountains, and when these mountains were isolated, the worshippers delighted in the toil of shaping them into regular forms, cutting them by stories, and making stories to reach the summit more easily. Both continents afford numerous examples of these hills, divided into terraces, and supported by walls of brick or stone. The pyramids appear to me to be merely artificial hills, raised in the midst of a plain, and intended to serve as a basis to the altars. What is more sublime and awful than a sacrifice that is offered in the sight of an assembled nation!"

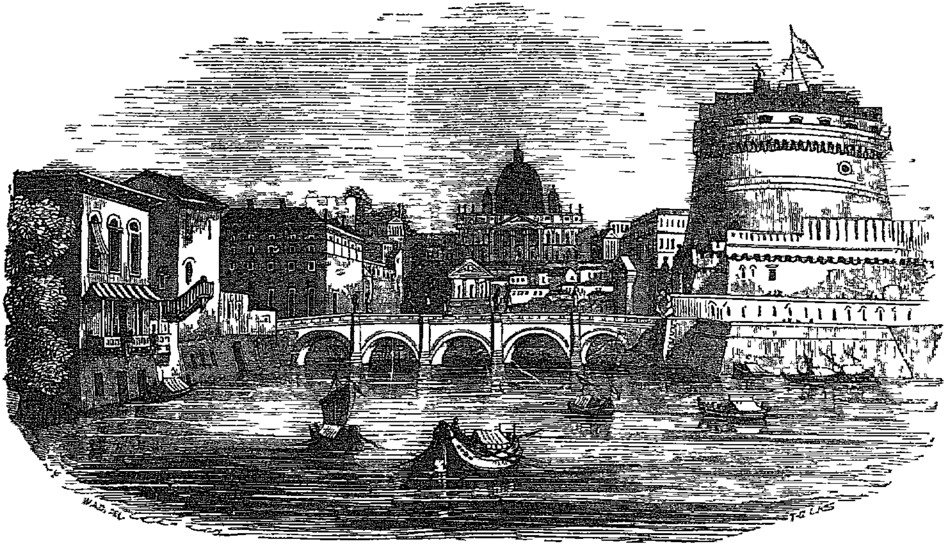
The Pyramid of Tapautla was by chance discovered some years ago by some Spanish hunters; for the Indians carefully conceal from the whites whatever was an object of ancient veneration. The form of this pyramid, which had six, perhaps seven stories, is more tapering than any other monument of this kind It is built entirely with hewn stones of an extraordinary size, and very beautifully and regularly shaped. Three staircases lead to the top. The covering of its steps is decorated with hieroglyphical sculpture, and small niches, which are arranged with great symmetry. The number of these niches seems to allude to the 318 simple and compound signs of the days of the civil calendar of the Tolbecks.

The researches of Humboldt gave, as might have been expected, a new impetus to the study of American antiquities. Among travellers who have made explorations, Mark Beaufoy, a British officer, published, in 1828, a work entitled "Mexican Illustrations." He thus describes a visit to a group of pyramids much less noted than those of Cholula:—"The most curious, and from various circumstances which connect them with the first colonization of America, by far the most interesting monuments in the Mexican territory are the Pyramids of Otumba. So little had I been led to expect from report, that these ancient edifices would be found more worthy of attention than the three ruinous pyramids of Cholula, that I had neglected to provide myself with the means of measuring them, or to make such arrangements as might have enabled me more thoroughly to investigate the extraordinary scene I was about to visit.

"The two pyramids of Otumba have their sides and shape perfectly distinct, facing the four cardinal points of the compass, with an inclination to the summit of about 45 degrees, and those summits appearing at a short distance to end in a peak. They are placed at half a mile from each other. Each has two stages about three feet wide, at regular distances up the sides, and running quite round the building. On the summit of each is a small platform, once apparently covered with cement, and probably surmounted by a temple; but a few modern ruins show clearly that the Spanish conquerors had erected chapels on the sites of the Mexican edifices. In no point could I discover anything resembling an entrance; but several large holes which had been dug into the sides, either from curiosity or avarice, gave me the opportunity of ascertaining that neither layers of brick, or adobas (unburnt), were used in the construction: common volcanic stones, with which the surrounding plain is strewed, appear to have been first agglomerated into the pyramidal mass, by means of a cement composed of water, earth, and mortar; and the faces of the four inclined planes *afterwards smoothed* and perfected as to their shape and proportions. The latter operation has been effected with so much care, and the fissures so well closed, that the small bushes now growing on them have scarcely proved injurious to the workmanship. The group of primitive remains which surround these remarkable structures are no less wonderful. Between the two pyramids, arranged in regular order, and forming a kind of street, are a vast number of small mounds or tumuli of volcanic stones; varying in height from five to twenty and thirty feet: these did not seem to have had their sides smoothed, but wore the appearance of heaps raised to commemorate the dead. To the right hand of the Pyramid of the Moon, stands the head of an immense idol, carved in a hard species of porphyry; and in another place a stone altar extremely well fashioned, which I measured as well as I could with my pocket-handkerchief, and then compared with my own height: this rude mode gave eleven feet long (for it had been thrown down), four wide, and four thick. The ground further to the right, outside of the tumuli, was thickly scattered with small earthenware heads, and grotesque faces of men."

ST. PETER'S.

The Basilica of St. Peter was the first and noblest religious edifice erected by Constantine. It stood on part of the circus of Nero, and was supposed to occupy a spot consecrated by the blood of numberless martyrs, exposed or slaughtered in that place of public amusement by order of the tyrant. But its principal and exclusive advantage was the possession of the body of St. Peter, which secured to it the first place in the affection and reverence of the Christian world. Every age, as it passed over the Vatican, seemed to add to it holiness and dignity; and the coronation of an emperor, or the installation of a pope, gave it so many new claims to the veneration of



THE CASTLE OF ST. ANGELO. ST. PETER'S FROM THE TIBER.

Christendom. At length, however, after centuries of glory, the walls of the ancient Basilica began to give way, and symptoms of approaching ruin were become so visible about the year 1450, that Nicholas V. conceived the project of taking down the old church, and erecting in its stead a new and more extensive structure. Successive popes have endeavoured to acquire a share in its glory and duration by some decoration or improvement. On the whole it would not be exaggeration to assert that three hundred years elapsed from the commmencement to the termination of this stupendous fabric. To calculate the expense would be difficult; but we may venture to state that it must have amounted at lease to twelve millions sterling; and when we consider that the marbles, bronze, and other valuable materials employed in its decoration, are not only uncommon, but scarcely known out of Rome, we may add that it would require three times as much to raise a similar edifice in any other capital. When the spectator approaches, he views four rows of lofty pillars, sweeping off to the right and left in a bold semicircle. In the centre of the area formed by this immense colonnade, an Egyptian obelisk, of one solid piece of granite, ascends to the height of one hundred and thirty feet: two perpetual fountains, one on each side, play in the air, and fall in sheets round the basins of porphyry that receive them. Before him, raised on three successive flights of marble steps, extending four hundred feet in length, and towering to the elevation of one hundred and eighty, he beholds the majestic front of the Basilica itself. This front is supported by a single row of Corinthian pillars and pilasters, and adorned with an attic, a balustrade, and thirteen colossal statues. *Far behind and above it rises the matchless dome*, the justly celebrated wonder of Rome and of the world. The colonnade of coupled pillars that surround and strengthen its vast base, the graceful attic that surmounts this colonnade, the bold and expansive swell of the dome itself, and the pyramid seated on a cluster of columns, and bearing the ball and cross to the skies, form the most magnificent and singular exhibition that the human eye perhaps ever contemplated. Two smaller cupolas, one on each side, partake of the state, and add not a little to the majesty, of the principal dome.

The *interior* corresponds perfectly with the grandeur of the exterior, and fully answers the expectations, however great, which such an approach must naturally have raised. Five lofty portals open into the portico, a gallery in dimension and decorations equal to the most spacious cathedrals. It is four hundred feet in length, seventy in height, and forty in breadth, paved with variegated marble, covered with a gilt vault, adorned with pillars, and pilasters, and terminated at both ends by equestrian statues, one of Constantine, the other of Charlemagne. Opposite the five portals of the portico are the five doors of the church. As you enter, you behold the most extensive hall ever constructed by human art, expanded in magnificent perspective before you. Advancing up the nave, you are delighted with the beauty of the variegated marble under your feet, and with the splendour of the golden vault over your head. But how great your astonishment when you reach the foot of the altar, and standing in the centre of the church, contemplate the four superb vistas that open around you; and then raise your eyes to the dome, at the prodigious elevation of four hundred feet, extended like a firmament over your head, and presenting, in glowing mosaic, the companies of the just, the choirs of celestial spirits, and the whole hierarchy of heaven arrayed in the presence of the Eternal, whose "throne high raised above all height" crowns the awful scene!

The high altar stands under the dome. In order to add to its relief, and give it all its majesty, a lofty canopy rises above it, and forms an intermediate break or repose for the eye between it and the immensity of the dome above. The form, materials, and magnitude of this decoration are equally astonishing. Below the steps of the altar, rise four twisted pillars fifty feet in height, and support an entablature which bears the canopy itself topped with a cross. The whole soars to the elevation of one hundred and thirty-two feet from the pavement, and, excepting the pedestals, is of Corinthian brass!—the most massive work of that or of any other metal now known. The chair of St. Peter (St. Peter never sat in it) is a lofty throne elevated to the height of seventy feet from the pavement, a circular window fringed with yellow throwing from above a milder splendour around it.

From the lower part of the Basilica, we pass to the roof by a well-lighted staircase, winding round with an ascent so gentle that beasts of burden go up without inconvenience. When you reach the platform of the roof you are astonished with the number of cupolas, and domes, and pinnacles, that rise around you; with the galleries that spread on all sides, and the many apartments and staircases that appear in every quarter. Crowds of workmen are to be seen passing and repassing in every direction, and the whole has rather the form of a town than that of the roof of an edifice. Here the traveller has an opportunity of examining closely and minutely the wonderful construction of the dome, and of discovering the skill and precision with which every part has been planned and executed. The vast platform of stone on which it reposes as on a solid rock; the lofty colonnade that rises on this platform, and by its resistance counteracts, as a continued buttress, the horizontal pressure of the dome, all of stone of such prodigious swell and circumference; the lantern which like a lofty temple sits on its towering summit; these are objects which must excite the astonishment of every spectator, but can be perfectly understoood and properly described by none but by a skilful architect thoroughly acquainted with the difficulties and the resources of his art.

The dome of the Pantheon, had for many ages excited the wonder and admiration of mankind, and this Bramante, the first planner of St. Peter's, would have imitated. But the dome of the Pantheon rested on columns and attained no striking elevation. "A similar cupola," said Michael Angelo, with the confidence of genius, "will I raise in the air!" And this was done by constructing walls sufficiently strong to sustain the enormous weight.

In whatever direction the traveller approaches Rome, he sees the sublime dome towering into the blue heavens. It seems to invite him from afar, and increases the impatience which all must feel on a first visit, to arrive at the Eternal City. *Like our own St. Paul's, but with the immense advantage of being almost constantly seen through the medium of* a pure, transparent atmosphere, it forms a grand and conspicuous object in almost every distant view of the city of which it is the glorious crown. It may be seen from the hills of Baccans on the north; from the Lower Apennines on the east; from the volcanic ridges of the Alban Mount on the south,; and from the mast-head of a ship in the Tyrrhene gulf of the Mediterranean on the west; and in all these views it rises up from the broad flat of the Campagna, in which the "Seven Hills," and other elevations in the neighbourhood of Rome, are of themselves ridges or breaks scarcely more perceptible than a distant wave at sea. It seems to reign in solitary majesty over the city; and is, perhaps, never so impressive an object as when seen thence, particularly on the stated festivals, on the evenings of which it is suddenly, nay almost instantaneously, covered with a flood of light. The reader may conceive this effect by fancying the dome of St. Paul's lighted up by innumerable lamps and torches; but we must add, in the case of St. Peter's, "the deep blue sky of Rome," without a cloud, without a vapour or a wreath of smoke.

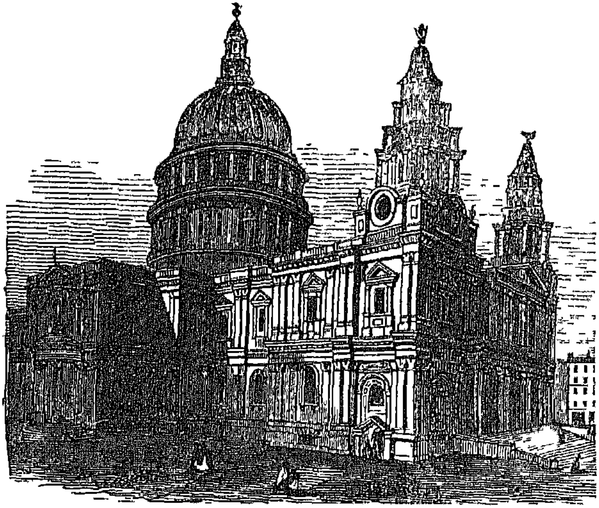
But thou, of temples old, or altars new,
  Standest alone—with nothing like to thee—
Worthiest of God, the holy and the true.
  Since Zion's desolation, when that He
  Forsook his former city, what could be,
Of earthly structures, in his honour piled,
  Of a sublimer aspect? Majesty,
Power, glory, strength, and beauty, all are aisled
In this eternal ark of worship undefiled.

Enter: its grandeur overwhelms thee not;
  And why? it is not lessen'd; but thy mind,
Expanded by the genius of the spot,
  Has grown colossal, and can only find
  A fit abode wherein appear enshrined
Thy hopes of immortality; and thou
  Shalt one day, if found worthy, so defined,
See thy God, face to face, as thou dost now
His Holy of Holies, nor be blasted by his brow.

BYRON.

ST. PAUL'S.

FROM the earliest times the hill on the summit of which St. Paul's with its magnificent dome towers above the vast metropolis, seems to have been consecrated by holy edifices. Ethelbert, the first Christian king of Kent, erected a church here (610), and dedicated it to St. Paul. In 691 it was burnt down, but is said to have been rebuilt in the same year. This church likewise became a prey to the flames about a century after. The succeeding edifice, known as Old St. Paul's, occupied one hundred and fifty years in erection, nor was it, in fact, completely finished until the reign of Edward II. in 1315. It was nearly seven hundred feet in length, one hundred and thirty in breadth, and the wooden spire attained the amazing height of five hundred and twenty feet. The spire was rebuilt in the year just specified, and the summit adorned by a ball and cross. In 1561 all the wood work of the cathedral was consumed by fire. It was indeed re-opened within five years, by the unremitting exertions of queen Elizabeth, but it remained a fragment, and gradually fell to decay, till, in 1663. under Charles I.



the subscriptions having amounted to £100,000, the important *task of restoring the building was entrusted to Inigo Jones.* Great was the neglect to which it had been exposed. It was a common lounging-place for idlers; and the people walked about with their hats on during divine service.

It is built in the form of a cross; its whole length from east to west is five hundred feet, that of the transept two hundred and eighty-five; the breadth is one hundred and seven feet, that of the transept nearly the same. The intersection of the nave and transept is surmounted by the dome, lantern, globe and cross. The height to the top of the cross is four hundred and four feet; that of the two towers of the west front, two hundred and twenty feet; of the walls about ninety feet. Within the iron railing (which cost £11,000) that incloses the burial ground of the cathedral stood formerly *Paul's Cross,* so frequently mentioned in English history. The sermons, some of which cost their authors so dear, were delivered in the open air. *There still exist benefactions for their continuance,* and though now preached in the choir, they are still distinguished by the name of Paul's Cross sermons.

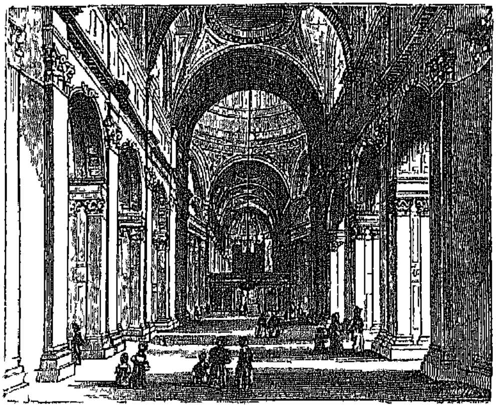
Such is a general outline of the external form of the Cathedral. But the vast pile, which would be imposing from its mere magnitude, had it little more to boast of, is invested with the highest degree of beauty and grandeur by the superb decorations with which almost every part of it is enriched. The west front is now generally admitted to be superior to any other in existence, not excepting that of St. Peter's. The grand portico in its centre consists of two parts; the lower formed by twelve columns of the Corinthian, and the upper by eight of the Composite order. Wren's original idea was to employ only one order, and a single series of pillars, ascending to the majestic height of nearly ninety feet. In simplicity and purity, this elevation would have been superior to the present; and the effect would have been very noble. But the design was found impracticable, from the impossibility of finding blocks, in the Portland quarries, of the requisite dimensions. It may be safely said that the great architect, by the arrangement actually adopted, has made as much as it was possible to do of the materials to which he was confined, and more than was ever before made of the same space. To a spectator coming up Ludgate Hill, which must be regarded as the grand avenue to the metropolitan temple, this façade seen through the narrow opening, presents a combination of majesty and beauty which cannot be contemplated by the intelligent eye without the deepest sense of the presence and the power of triumphant art. It sometimes happens that the rays of the afternoon or evening sun, coming through a clear atmosphere, are thrown strongly upon the columned and sculptured display, while a black cloud, veiling the opposite quarter of the heaven, forms a back-ground, from which the whole pile projects in full relief, and so as to produce the finest contrast of light and shade.

Excepting the view of the west front from Ludgate Hill, there is scarcely a good view to be had of any other part of the church. The towers and dome, indeed, are seen to great advantage from Blackfriars and Waterloo bridges; but none of the under portion of the building is visible from these points. The glimpse afforded by the opening into Cheapside is extremely limited, and the east end runs so close to the houses as scarcely to be visible except from their windows.

The public are not admitted by the main door, but by the door of the north transept, the effect of which is that whatever of majesty and harmonious beauty there is in the plan and disposition of the interior is lost to the visitor on his first advance. While, notwithstanding its inferior dimensions, the external appearance of St. Paul's has been preferred by many to that of St. Peter's, it is admitted by all that the interior of the English cathedral will bear no comparison with that of the Roman. The upward view from under the dome of St. Peter's has been generally acknowledged to have no rival in the world The corresponding spot in St. Paul's is also that from which the surrounding scene assumes its most imposing aspect. There is extent enough to convey an impression of extraordinary magnificence. The dome, though not so elevated as that of St. Peter's, is still very lofty, while the form of the concave in the former has been considered more beautiful than that of the latter.

The objects in the interior, by which the attention of visitors is usually first attracted, and longest detained, are the monumental sculptures erected in honour of various distinguished men. The first statue introduced was that of Howard, the philanthropist, followed by one of Dr. Johnson. Sir William Jones, and Sir Joshua Reynolds, also are here honoured. But, in general, while civil eminence has been commemorated in Westminster Abbey, St. Paul's has been made a Pantheon for those who have immortalized themselves by their brilliant achievements in defence of their country. Here are, among others, Elliot, the heroic defender of Gibraltar, and Howe, and Jervis, and Duncan, the victors of Brest, and Cape St. Vincent, and Camperdown; Nelson, and Collingwood, and Abercrombie, and Moore, too, are here.

In the library the attention of visitors is directed to the curious floor, in which a great number of geometrical figures are formed by pieces of variously-coloured oak. In the model-room, there is a model of the Cathedral, according to what is said to have been the favourite design of Sir Christopher Wren. The whispering-gallery runs round the base of the dome. The view downwards into the body of the church from this gallery is very striking. The dial-plate of the clock is fifty-seven feet in circumference, or nearly twenty in diameter; and the minute-hand is eight feet long—dimensions that would scarcely be conjectured by those who have only seen it from the street below. The great bell, on which the hours are struck, weighs between eleven and twelve thousand pounds. From the whispering-gallery, the visiter may ascend successively to the first and second gallery around the outside of the dome, and even into the ball itself, which is capacious enough to hold perhaps half a dozen people at once. One of the wonderful things connected with St. Paul's is the wonderful sum of money charged for inspecting it! It is less a church



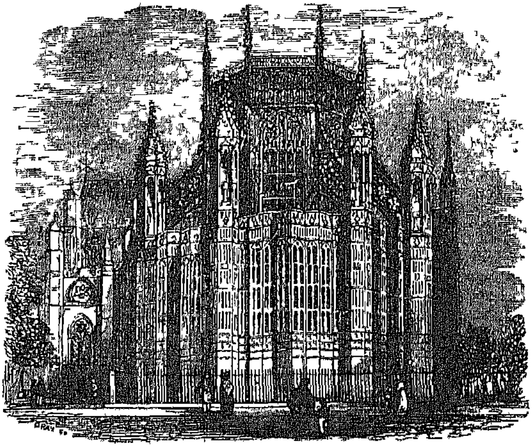
INTERIOR OF ST. PAUL'S CATHEDRAL.

than a show, and the dearest show, too, in London. Were it in the hands of any other class or corporation but the clergy, there would be no complaint on this head, or at least they would never have so long remained utterly unimpressed and apparently unimpressible, by the eternal complaint and contempt to which their avarice has given rise.

WESTMINSTER ABBEY.

WESTMINSTER ABBEY, is not only a most beautiful specimen of architecture, but is an historical monument in which every Englishman feels interested, and of which he feels proud. It is built in the form of nearly all ecclesiastical buildings of the same style—that of a cross. The eastern part is surrounded by chapels of various forms and sizes—that of Henry VII. being the most capacious and magnificent. It is to be regretted that, like every other building of ancient interest in the metropolis, it is unfavourably situated, or, at least, unfavourably *surrounded*. It is from the west entrance that the most striking and effective view of the *interior* is to be obtained. The view from this point is more extended and unbroken, and the architectural character of the building appears more complete, than from any other. The lights, too, are so judiciously introduced, and the arrangements and proportions of the columns so nicely adjusted to the forms and magnitude of the arches, and to the aerial loftiness of the vaulting, that the whole combines into one harmonious perspective, and for a time the spectator feels a stronger inclination to contemplate the picture than to examine the design; and as almost every part displays an exuberance of monumental decoration, in which the art of sculpture has been carried to a very high degree of excellence, there is probably no structure in the kingdom from the examination of which the intelligent mind can derive a greater pleasure.

On entering Henry the Seventh's Chapel, which is slightly elevated above the ground-floor of the Abbey, and is approached by steps of black marble, the spectator pauses to gaze upon the extraordinary scene. The "dim religious light" which fills the place inspires him with a solemn feeling of devotion, and he is enchained by the potency of art. Nothing can be conceived more exquisite in proportion, or more harmonious in detail. The shafts of the arches spring with almost magical lightness towards the fretted roof, which is



EXTERIOR OF HENRY THE SEVENTH'S CHAPEL.

most gorgeously elaborated with an astonishing variety of figures. The walls contain upwards of one hundred and twenty statues of patriarchs, saints, martyrs, and confessors, besides angels and innumerable other smaller figures. But profuse as is the richness of ornament, there is no spoiling of the general effect by a crowding together of disproportioned carvings; all is in perfect accordance with the purest taste. The building will thus ever be regarded as one of the most unique and splendid specimens of the pointed style of architecture erected in Europe.

In the Chapel of St. Edward the Confessor stands that celebrated monument of popular curiosity, the *Coronation Chair.* Inclosed within the frame-work is the far-famed *Coronation Stone* brought from Scone by Edward I., on which the Scottish kings were crowned The coronation of the kings of England in this Abbey forms one of its peculiar features of interest. Some of them have been scenes of extraordinary magnificence At Henry the Eighth's coronation, whatever could dazzle the eye in the rich barbaric pomp of the time was exhibited. Great part of Cheapside was covered with cloth of gold, and the fronts of houses were hung with tapestry, during the procession.

We cannot describe the various monuments which have here been raised to departed genius and power. The famous "Poets' Corner" is a sacred spot. Here Chaucer, the Homer of England, has his memorial; Milton, whose mind pierced into "the region of invisibles"; Shakspeare, whose empire was man; Butler, the quaint and witty; rare Ben Jonson; Dryden, Cowley, Spenser, Thomson, Goldsmith, Addison, and Watts, with Handel and Garrick. "I passed (says Washington Irving) some time in Poets' Corner. The monuments are generally simple, for the lives of literary men afford no striking themes for the sculptor. Notwithstanding the simplicity of these memorials, I have always observed that the visiters to the Abbey remain longest about them. A kinder and fonder feeling takes place of that cold curiosity, or vague admiration, with which they gaze on the splendid monuments of the great and the heroic. They linger about these as about the tombs of friends and companions." Again, on leaving the building, "I endeavoured to form some arrangement in my mind of the objects I had been contemplating, but found they were already falling into indistinctness and confusion. Names, inscriptions, trophies, all had become confounded in my recollection, though I had scarcely taken my foot off the threshold. What, thought I, is this vast assemblage of sepulchres, but a treasury of humiliation; a huge pile of reiterated homilies on the emptiness of renown, and the certainty of oblivion! What is to ensure this pile which now towers above me from sharing the fate of mightier mausoleums? The time must come when its gilded vaults shall lie in rubbish beneath the feet; when, instead of the sound of melody and praise, the wind shall whistle through the broken arches, and the owl hoot from the shattered tower;—when the garish sunbeam shall break into these gloomy mansions of death; and the ivy twine round the fallen column, and the foxglove hang its blossoms about the nameless urn, as if in mockery of the dead."

YORK MINSTER.

Among Gothic structures, York Minster (a corruption of *monastery*) has generally been regarded as without a rival in England, or perhaps in the world. It is perhaps the most perfect example to be anywhere found of the embodied *history and progress* of gothic architecture, having occupied two centuries in construction. It has not the advantage of standing upon a height; yet its enormous mass makes it a conspicuous object from a great distance, and nothing can be grander or more imposing than the aspect which its lofty buttresses and grey towers present as they are seen rising over the surrounding houses of the city, which look like the structure of a pigmy generation beneath the gigantic and venerable pile. Its position is marred by the surrounding buildings. The formation of a large open square around the noble old edifice would exhibit the gigantic structure in all its surpassing magnificence. As it is, the grandeur of the Minster is principally in the interior. The effect of the whole prolonged and lofty extent, as seen on entering from the great west door, is perhaps as sublime as any ever produced by architecture. Under favourable circumstances, such as the rich illumination of a setting sun, the impressions of awe and veneration produced upon the mind by the grandeur and beauty of this wonderful building, are perhaps superior in intensity to the effects of any other work of man's hands. We doubt whether the finest Grecian temple could ever so touch the hidden springs of enthusiasm in our nature. The choir is divided from the nave by a stone screen; but this ornamental portion is so low as not to intercept the view of the portion of the roof beyond, nor 'the dim religious light' streaming from the magnificent storied window that fills the east end of the building. This screen and the great east window are two of the proudest ornaments of the cathedral. The former is a work in the very richest style of ornamental carving; the latter is of the vast dimensions of seventy-five feet in height by thirty-two in breadth. It is formed of above two hundred compartments in painted glass. The execution of this noble work of art was begun in 1405, by John Thornton, of Coventry, whose agreement was to complete it in three years, during which time he was to have a salary of *four shillings per week*, with one hundred shillings additional per annum, if it should be done to the satisfaction of his employers! Of course money was of different value then, but still it shows the estimate put upon genius even by those who placed the highest value upon its productions. York Minster was very nearly destroyed in 1829, by the act of an insane individual, who set fire to it. The damage done consisted in the entire destruction of the stalls of the choir, and of the 222 feet of roof by which that part of the building was covered. A public subscription was immediately commenced for the repair of a loss which was justly considered a national one, and the sum of £50,000 was collected within two months. Except that the choir looks cleaner and fresher than formerly, a person unacquainted with the circumstances would not perceive any change.

THE CATHEDRAL AT MILAN.

WHAT the Spaniards say of the Escurial, the Milanese say of their cathedral, viz., that it is the *eighth wonder of the world;* Inferior only to St. Peter's, in length it equals, and in breadth surpasses the cathedral of Florence and St. Paul's. In the interior elevation, it yields to both; in exterior it exceeds both; in fretting, carving, and statues, it goes beyond all churches in the world, St. Peter's itself not excepted. Its double aisles, its clustered pillars, its lofty arches, the lustre of its walls, its numberless niches, all filled with marble figures, give it an appearance novel even in Italy, and singularly majestic. The pillars are more than ninety feet in height. The pavement is formed of marble of different colours, disposed in various patterns and figures. Every niche has its statue, which amount to more than four thousand. The roof of the church is covered with blocks of marble, connected together by a cement that has not only its hardness and durability, but also its colour, so that the eye scarcely perceives the juncture, and *the whole roof appears one immense piece of pure shining marble.* The view from the summit is extensive, including not only the city and rich plain of Milan, intersected with rivers and canals, covered with gardens, orchards, vineyards, and groves, and thickly studded with villages and towns; but extending the grand frame of this picture, and *taking in the neighbouring Alps, forming a magnificent semicircle,* and uniting their bleak ridges with the milder and more distant Appennines.

In materials this cathedral surpasses all others. The noblest of them are only lined and coated with marble, but this is *entirely built, paved, vaulted, and roofed with it, and that of the whitest and most resplendent kind!*

The most remarkable object in the interior is the subterranean chapel, in which the body of St. Charles Bouornes reposes. It is immediately under the dome, in form octangular, lined with silver, and divided into panels representing the principal actions of the life of the saint. The body is in a shrine of rock-crystal. The saint so honoured, was a man of princely birth and fortune, who filled the highest ecclesiastical offices, and rendered the most meritorious services to his people. He founded schools, colleges, and hospitals, built parochial churches, most affectionately attended his flock during a destructive pestilence, erected a lazaretto, and served the forsaken victims with his own hands. These are duties uncommon, and of course, applauded; but to reform a clergy *and people, depraved and almost barbarized by ages of war;* to extend his influence to every part of an immense diocese, including some of the wildest regions of the Alps; to visit every village in person, and to inspect and correct every disorder, are offices requiring real heroism; and this part of his pastoral duty he went through with the courage of an apostle. So great was his success, that the diocese of Milan, the most extensive perhaps in Milan, became a model of order and virtue. The reformation extended far beyond his own diocese, even over France and Germany. Many of his excellent institutions still remain, and among others, that of *Sunday-schools;* and it is both novel and affecting to behold on that day the vast area of the cathedral filled with children, forming two grand divisions of boys and girls, ranged opposite each other, and these again subdivided into classes, according to their ages and capacities, drawn up between the pillars, while two or more instructors attend each class—in general a clergyman accompanied by a layman for the boys, and by a matron for the girls. These assistants are sometimes persons of the highest rank. Tables are placed in different recesses for writing—a practice which the pious archbishop introduced into every part of his immense diocese, and which is carried out in *all the parochial churches.* When will the parochial churches of England be turned to as useful a purpose?

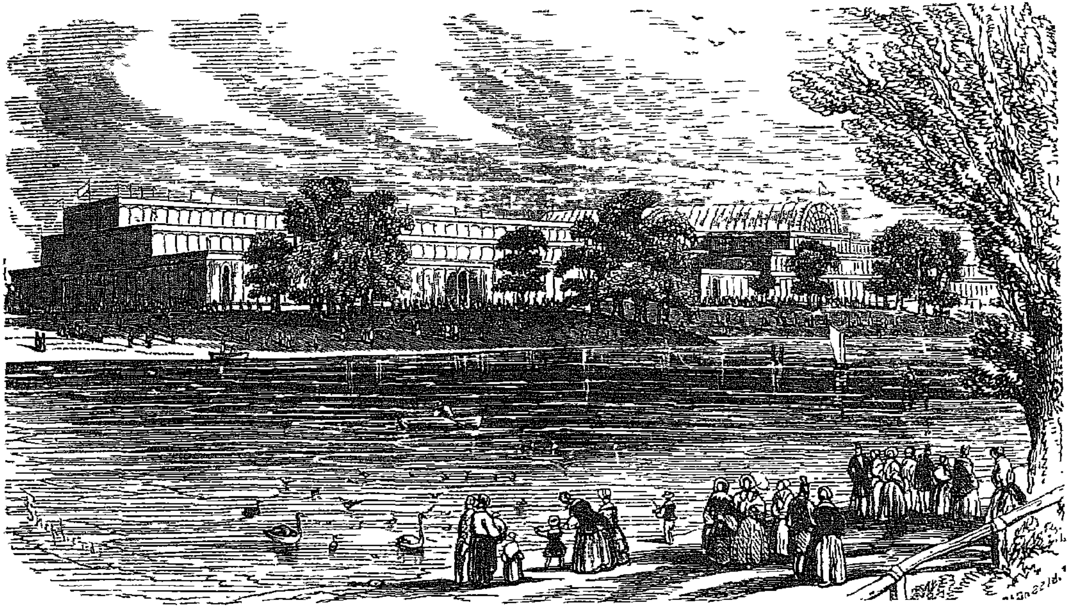
We have wandered into a digression in speaking of the good St. Charles; but this primitive founder of Sunday-schools interests us, and a fact or two more about him may be pardoned as a sort of variety (to say the least) in the midst of our architectural surveys. His private virtues were as remarkable as his public actions. His table was for his guests; his own diet was *vegetarian.* His dress and establishment were such as became his rank; but his personal wants were few and his habits severe. His charities exceeded the income and magnificence of sovereigns. In every city in which he had at any time resided, he left some monument of useful munificence; a school, a fountain, an hospital, or a college. Ten of the latter, five of the preceding, and the former without number still remain at Pavia, Bologna, Milan, and in all the towns of its diocese. His private estates were devoted entirely to beneficence, his archiepiscopal revenue he divided according to the ancient custom, into three parts, one of which was appropriated to the building and repair of churches, the second to the poor, and the third to his domestic expenditure. No wonder that the Milanese call him a *saint*:—would that we had more such saintly prelates now!

THE FIRST CRYSTAL PALACE, HYDE PARK.

THE circumstances connected with the Great Exhibition of 1851 are so well known that a description might be spared; but we write not solely for the present generation, and a majority of our readers even now may have had no means of learning about this great undertaking save from such pen and pencil descriptions as we here give.

There is no one circumstance in the history of the manufacturing enterprise of the English nation which places in so strong a light as this its boundless resources in materials, to say nothing of the arithmetical skill in computing at what cost, and in how short a time, those materials could be converted to a special purpose. Two parties in London, relying on the accuracy and good faith of certain iron-masters, glass-workers in the provinces, and of one master carpenter in London, bound themselves for a certain sum of money, and in the course of some four months, to cover eighteen acres of ground with a building upwards of a third of a mile long (one thousand eight hundred and fifty-one feet—the exact date of the year), and some four hundred and fifty feet broad. In order to do this, the glass-maker promised to supply in the required time, nine hundred thousand square feet of glass (weighing more than four hundred tons), in separate panes, and these the largest that ever were made of sheet glass; each being forty-nine inches long. The iron-master passed his word in like manner to cast in due time three thousand three hundred iron columns, varying from fourteen feet and a half to twenty feet in length; thirty-four miles of guttering tube, to join every individual column together under the ground; two thousand two hundred and twenty-four girders (but some of these are of wrought iron); besides eleven hundred and twenty-eight bearers for supporting galleries. The carpenter undertook to get ready within the specified period two hundred and five miles of sash-bar; flooring for an area of thirty-five millions of cubic feet; besides enormous quantities of wooden wallin, louvre work, and partition.

To do justice to all the marvels of the Great Exhibition, and the varied wonders of its construction, would make an interesting volume of itself; a few facts and figures more



THE CRYSTAL PALACE, LOOKING ACROSS THE SERPENTINE.

must suffice. The total area of ground floor was equal to seven hundred and seventy-two thousand seven hundred and eighty-four square feet, and that of the galleries to two hundred and seventeen thousand one hundred square feet. The galleries extended nearly a mile. The table space for exhibitors was more than eight miles in length. The total cubic contents of the building were thirty-three millions of feet. There were thirty-four miles of gutters, two hundred and two miles of sash-bars, and nine hundred thousand superficial feet of glass, weighing four hundred tons. It was finished in about one hundred and fifty working days. St. Paul's occupied thirty-five years in building, while this did not occupy half of that number of weeks. Each man fixed about two hundred superficial feet of glass per day. The average number of workmen employed was about one thousand eight hundred, amongst whom about £2,500 was weekly paid in wages.* The general appearance of the building was thus described by the *Times*:—

"The vast fabric may be seen, by any one who visits that part of the town, in its full dimensions—an Arabian Night's structure, full of light, and with a certain airy unsubstantial character about it, which belongs more to enchanted land than to this gross material land of ours. The eye, accustomed to the solid heavy details of stone and lime, or brick and mortar architecture, wanders along those extended and transparent aisles, with their terraced outlines, almost distrusting its own conclusions on the reality of what it sees, for the whole looks like a splendid phantasm, which the heat of the noon-day sun would dissolve, or a gust of wind scatter into fragments, or a London fog utterly extinguish. There, however, the Crystal Palace remains, a monument of the extent to which lightness of structure can be combined with permanence and strength,—a building remarkable not less for size than for the beauty of its mathematical proportions and rectangular outlines. The varied dimensions and fantastic features of other edifices there find no parallel. Everything is done by the rule, and yet everything is graceful, and it might almost be said grand. Wherever one stands, no disagreeable effects present themselves—nothing crooked, awkward, or out of place. The subordination of parts to the whole is complete, and an expression of order and exactitude reigns throughout, not unaptly typical of the progress which the mechanical sciences have made in this country. But for that progress the Crystal Palace could never have been constructed, and it certainly is curious to reflect, now that the work has been accomplished, and the great result stands patent to the world, that with the facilities we possessed, glass and iron have hitherto been so little employed by our architects.

Like many other great structures which will readily suggest themselves to the mind of the reader, the Crystal Palace must be viewed from a distance to be appreciated. Whoever would see a great mountain to perfection must not survey it immediately from its base, and on exactly the same principle the new edifice in Hyde Park cannot be well viewed from the Kensington Road. The drive along the Serpentine and the bridge over it are the best points for a spectator to select. There the ground rises, and the vacant space enables the eye to reach over a large proportion of the building. The trees partly shut out the prospect, but enough remains to astonish and to captivate. The vast extent of area covered, the transparent and brilliant character of the structure, the regular and terraced elevations, the light airy abutments, the huge transept, with its arched and glittering roof shining above the great vitreous expanse around it, remind one of nothing that he has ever heard of before."

THE CRYSTAL PALACE, SYDENHAM.

The Great Exhibition of 1851 was erected for a temporary purpose, and with the express condition that the building should be removed when the object for which it was designed was attained. On its completion, however, the novelty and unique beauty of the edifice were such as to cause a universal feeling of regret at the prospect of its demolition, and induce a very general wish for its permanent retention in Hyde Park; but the Government of the day refused to sanction its continuance on that site, and the fiat for its destruction had already gone forth, when a number of highly influential individuals, having at their head Samuel Laing, Esq., M.P., the then chairman of the Brighton Railway Company, resolved on its preservation, and determined that from the ruins of the Exhibition Building a new Crystal Palace should arise, especially devoted to recreation and instruction, surrounded with flowers and fountains, in a commanding situation of unequalled natural beauty, and of easy access from the metropolis.

In order to ensure the confidence of the public, and the success of their undertaking, the Exhibition Building was purchased from the contractors for the sum of £80,000; the Crystal Palace Company was formed, with a capital of £500,000; a highly eligible site, adjoining the Brighton

Railway, consisting of 300 acres, was obtained; and the services of the most eminent individuals connected with the Great Exhibition, including Sir Joseph Paxton, Messrs. Fox and Henderson, Mr. Owen Jones, Mr. Digby Wyatt, Mr. Francis Fuller, and other well known gentlemen, were secured, and the Park and Palace were thrown open to the public on the 10th of June, 1854.

The site occupied by the Crystal Palace is an irregular parallelogram of 300 acres, extending from the Brighton Railway, with a frontage of 1,300 feet between the Sydenham and the Anerley Stations, to the road which borders the top of Dulwich Wood, where it has a frontage towards the road of 3,000 feet. The commanding position on the summit of the hill renders the building visible from London on the one side, and from a vast extent of country on the other. It is distant from London about seven miles, and perhaps it would have been impossible to have chosen a better site for the Palace than this picturesque and healthy spot.

The length of the building is 1,608 feet; and a centre transept, with a vast circular roof 120 feet in diameter, rises majestically over the nave; with two end transepts, similar to that of the old building.

The wings project a considerable distance forward into the grounds, encompassing terrace-gardens occupying more than 30 acres, and terminated with glass towers, which command an extensive view of the grounds and surrounding country.

The opposite ends of the centre transept form the two grand entrances to the Palace,—the one on the east side, from the gardens, the other, the carriage approach, or main entrance, on the west side, by an enclosed porch, projecting from the building, of the full width of the transept. The western entrance commands nearly as fine a view, towards London, as the east, or garden prospect, which looks far away over an expanse of country. more extended than that obtained from the well known terrace of St. Cloud.

On each side of the great transept are arranged the various courts, English, French, Italian, German, Egyptian, &c. The most beautiful of these is the Alhambra Court, especially the Hall of Justice, with its roof, a hanging honeycomb of gold and richly-blended colour, graceful pillars of alabaster, and walls covered with mottoes from the Koran, in Arabic.

The Alhambra, of a portion of which this court is a reproduction, is an ancient fortress, or castellated palace, of the Moorish kings of Granada. The construction of the gorgeous vaulting in the original is a wonder in itself, the whole being composed of 5,000 pieces, so cunningly wedged together as to maintain themselves aloft.

On the north portion of the nave are situated the Manufacturing Courts, fitted up in the most attractive style. They were erected to correspond with those devoted to architecture and sculpture. All the courts are entered by doors on each side, and have an enriched front towards the nave.

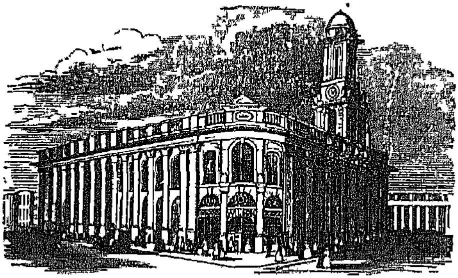
The greater part of the gardens are upon the south front of the Palace, and have a succession of terraces and flights of steps, on a scale of surprising magnificence.

About midway of the outermost boundary of the grounds stands the magnificent basin of the Great Fountain, 1,200 feet in circumference. This stupendous fountain throws its highest stream 230 feet into the air, and possesses 1,000 jets, so graduated from the centre one, as to form a cone of moving water.

Opposite each of the end transepts are placed two other fountains of considerable magnitude. Beyond the great fountain, the walk is flanked on either side with a series of cascades, and the water of the numerous *jets-d'eau* finds its way into the Lake at the bottom of the grounds, which extends over an area of thirty acres.

The shores of the lake and islands are occupied by models of the plesiosaurus, megatheria, iguanoda, ichthyosaurus, megalosaur, and other monsters of former geological periods.

THE ROYAL EXCHANGE.



ONE of the noblest and most wonderful buildings in London is the Royal Exchange. The foundation-stone was laid by Prince Albert, on the 17th of January, 1842, and the building opened on the 28th of October, 1844, by the Queen. It cost £180,000. Two former Exchanges were successively burned down on that site; that of Gresham, the founder, in the great fire of Charles the Second's reign, and Jarman's, the last and most celebrated, in 1838.

In front of the structure stands Chantrey's equestrian statue of the Duke of Wellington, the metal of the work being obtained from artillery taken by his Grace in various battles. The cost of the statue, exclusive of the value of the material, which is reckoned to be about £1,500, was upwards of £9,000, the whole of which was raised by public subscription. As we enter the quadrangle, we shall perceive the statue of her Majesty in the centre, and observe the small Turkey stones with which the inner space is paved; they are the identical stones used in the former building; and the margin of freestone surrounding them, will show you by how much larger the space appropriated to the merchants is now than formerly. All round, in the perambulatory, are what are known as the merchants' "walks." The present Exchange is three hundred and ninety feet long from east to west; the quadrangle is one hundred and seventy long by one hundred and twelve wide; and the height of the tower is one hundred and seventy-seven feet. Not the least interesting part of the Exchange is the suite of apartments at the east end, known as "Lloyd's," which word is understood all over the world as indicative of the valuable company of underwriters, or ship-insurers, who occupy these rooms. The agents of Lloyd's are to be found in almost every seaport in the world; and, through the medium of the small daily paper known as "Lloyd's List," shipping and commercial intelligence is promulgated all over the country. As soon as a vessel has sailed, it is notified in this little newspaper; when she is "spoken" by another vessel, far out at sea, perhaps; when she arrives at her destined port; when she takes her departure thence; when she reaches home again, ; or, haply, when she is lost by fire, or wrecked in the unfathomable waves, intelligence reaches the underwriters at Lloyd's with the most unerring certainty.

THE MOSQUE OF CORDOVA.

CORDOVA, after the Saracen conquest, became the first capital of the Mohammedan empire in Spain, and at one time contained sixteen hundred mosques and a million of people. Its past greatness is still attested by the vast and now almost empty circuit enclosed by its walls, in a great measure filled with palm-trees and gardens, and by the astonishing remains of its great mosque, which, taken altogether, is perhaps one of the most extraordinary architectural works in the world, and owes its origin to the desire of one of the Moorish kings to raise a mosque, which should be to the faithful in the West what Mecca was to those of the East, and which should, at the same time, surpass its predecessor in richness and grandeur. He had the good fortune to find an architect and workmen able to carry out his design. Genius is never awanting, where there is the will and power to employ it. The work was commenced in 770. The site chosen was an elevated but irregular space, which on one side extended downwards to the banks of the Guadalquiver. In its present state, there is nothing very striking in its exterior, which is in a great measure hid by the surrounding streets. But when a stranger enters any one of its nineteen gates, he is astonished and bewildered by the endless labyrinth of columns which stretch before him in every direction. These columns have almost defied the attempts to number them; and from their disposition, produce a perpetual and surprising change of scene to the visitor.

In its original state the mosque occupied a square space measuring six hundred and twenty feet by four hundred and forty feet. There were seventeen gates, all covered with plates of bronze of the most delicate design and workmanship. There were nineteen ranges of columns extending in perfectly straight lines from north to south; and the columns were placed at such a distance from each other as to form, when looked at from the east or west, thirty-five ranges. The pillars accordingly appeared endless in number, and travellers have varied in their calculations from four hundred to fourteen hundred!

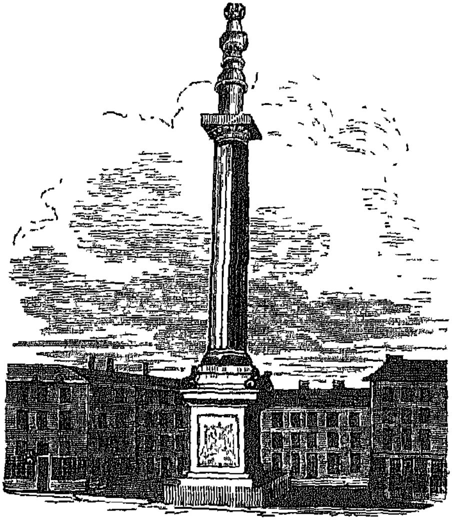
"This magnificent mosque (according to an Arabian historian,) surpassed all those of the East. It was entered through nineteen gates, the principal of which was covered with plates of gold; these led to its Alkibla through nineteen streets (aisles) of columns of different marbles, very precious and marvellously wrought, and these were crossed by thirty-eight streets from east to west, in each of which sides were nine gates. The number of the columns was one thousand and ninety-three. Aban Hazan says that the height of its Alminar, or tower, was forty fathoms; above the highest cupola there were three gilt globes, and above them a pomegranate of gold. For the prayers at night were lighted four thousand seven hundred lamps, which consumed every year twenty-four thousand pounds of oil, and one hundred and twenty pounds of aloe and amber for perfumes. The lamp of the secret oratory was of gold, and of marvellous workmanship and size."

The present number of pillars is six hundred and thirty-two, and every one in such a vast forest, so to speak, is of marble or other precious stone: we find them of jasper, porphyry, verd-antique, and of the choicest marbles—grey, red, green, blue, yellow, fawn-coloured, and white, most beautifully veined, streaked, ribboned, and watered. Their value must be enormous. Indeed, one knows not which to admire the most, their number or their individual beauty. A solemn gloom pervades all the place, for light is admitted but at infrequent intervals. The wood-work of the roof is not less curious in its way than the other parts of this wonderful structure. It is said to have been taken from a forest then standing on the opposite bank of the river, but of which no traces now remain. It is so well preserved that it is said to be incorruptible. It is a species of pine, and possesses a sweeter odour than any other kind now known in the country. The joists are covered with paintings and ornaments. Where the walls remain in their original state, they are covered with a profusion of minute ornaments, containing here and there sentences from the Koran, inscribed within wreaths and garlands. But the chapel of Mahomet surpasses in beauty every other part of the mosque. There are three enclosures or chapels, separated from the main building, and from each other by columns of jasper and the richest marble. The centre inclosure at once fixes the attention. In the wall is a horse-shoe archway leading into an inner room, and around it is a deep facing of arabesques of the most elegant patterns and brilliant colours, red, black, and gold, formed by a mosaic work of crystal of inimitable beauty. About this are long straight bands of Arabic inscriptions in large gold letters on a black ground, or *vice versa:* and above it, the wall rises, clothed with tracery in relief, to the roof, which is lofty, lantern-shaped, richly gilt, and lighted by small apertures or windows without glass. The apartment within the arch is an octagon of fifteen feet—its height the same; the walls are ornamented with columns and arches in relief; and the roof is of pure white marble *in a single piece,* carved in the form of a scallop-shell. This was the Maksura, where was deposited the Koran. When illuminated by the massive silver chandelier that hung from its centre, its gorgeous beauty must have surpassed every thing our imagination can conceive of Eastern magnificence. The garden, or court of orange-trees, was originally surrounded with a portico supported by sixty-two columns. It is elevated upon an enormous cistern, and contains but four or five feet of soil. This, however, appears to have been amply sufficient, for there are a great number of flourishing orange and citron-trees, and some few cypresses, all very ancient. There are also several fountains of gushing waters, falling into marble basins filled with glittering shoals of gold and silver fish. The chief entrance to the mosque lay through this garden, where the comers performed their ablutions and then passed barefooted into the sacred building. The garden itself was reached by a large horseshoe archway thirty feet high and fifteen broad, and which was beautifully called the *gate of pardon.* Over this rises a square tower to the height of nearly three hundred feet, and on the archway is inscribed from the Koran, "O true believers! come not to prayers when ye are drunk."

In later times the mosque has been converted into a Christian cathedral. To adapt it to this purpose a choir has been erected in the centre. It is of great beauty but out of harmony with the Saracenic part of the structure. The inhabitants of Cordova, to their credit, remonstrated against the conversion of the mosque; the friends of the arts were still more energetic in their opposition; the king himself, Charles V., was averse to it, but the clergy were powerful, and ultimately prevailed. It is still, however, generally called the *Mosque*, and seldom, the *Cathedral.*

THE MONUMENT.

Soon after the fire of London, which happened in September, 1666, Sir C. Wren submitted to the public a design for rebuilding the city in a manner which he considered worthy of the metropolis of England. His plans were rejected, as requiring too much time and money. His talents, however, were called into action in re-erecting churches and public buildings: among others, *St. Paul's*, *St. Stephen's*, *St. Mary-le-Bow*, and *St. Bride's.* To commemorate the fire, a Monument was erected on the spot where it began; it is considered one of Wren's finest structure. It is a Doric column, 202 feet high. At the top is seen to rise a huge mass of flames, strongly gilt, proceeding out of an urn. *This* is not part of Wren's design, which was to place at the top a colossal statue



of the reigning monarch, Charles II. Within is a staircase of black marble, of 345 steps; and on the exterior a roomy balcony, within thirty-two feet of the summit. The view from this position on a clear day is extremely fine. The number of steps is 311. The building was begun in 1671, and finished in 1677, at a cost of £14,500.

On the north side of the pedestal is an inscription, stating some particulars of the calamity, by which were consumed "89 churches; various public buildings; 400 streets; 13,200 dwelling-houses; the ruins of the city being 436 acres." It says, "that the fire was merciless to the property of the citizens, but to their lives very favourable; and that after three days from its commencement, during which time it had baffled all human endeavours towards extinguishing it, it stopped, as if by the will of Heaven." On the south side is described the remedy applied by Charles II., while the ruins were yet smoking, for the comfort of the citizens and the ornament of the city, by remitting the taxes; by engaging to restore the churches, &c. The east side has the dates of the foundation and completion. On the west, or front, is an allegorical subject, representing *London*, as a female figure, lying distressed on the ruins *Time*, however, is in the act of lifting her from the earth, while *Providence* points to the skies. The *King* is seen in a Roman dress, giving encouragement and directions for the rebuilding; while *Liberty*, *Genius*, and *Science*, in a group about him, await his orders. Behind the king are labourers at work, scaffolding, &c., and other signs of cheerful occupation near him; almost under his feet, *Envy* is shown enraged at the prospect of success, and blowing flames towards the prostrate city. Emblems of war are also introduced (the fire having occurred during a time of war); while *Mars*, with a chaplet in his hand, signifies that honourable peace was at hand Round the base of the pedestal was an inscription attributing "the dreadful burning of this Protestant city to the treachery and malice of the Popish faction." In the time of James II., the inscription was cut away, but restored in deep characters in that of William III. It has lately been again erased. It is believed that there was no foundation for the imputation.

TRAJAN'S COLUMN

WAS erected, A. D. 115, by the senate and people of Rome, to commemorate the victory of Trajan in his two Dacian campaigns. His ashes were placed in a golden ball at the top,—a singular honour, as it was a strict law of the Romans to prohibit burials of any kind within the walls. (Such was sanitary improvement then!) The height of the pillar, including the statue which formerly surmounted it, is reckoned by ancient writers at one hundred and forty feet. Without the statue, as it at present stands, it is one hundred and twenty-four feet. When this colossal statue was thrown down is unknown. The feet were standing in the time of Pope Sixtus V., and the head was found in the rubbish at the base. The statue of St. Peter, now on the summit, is eleven feet high, and of gilt bronze; it was put up by Sixtus V. in 1587. The whole pillar is formed of thirty-three large blocks of marble, of which eight are used in the base, twenty-three in the shaft, one in the capital, and one above it. The diameter of the shaft is eleven feet two inches at the bottom and ten feet at the top. The base is square and measures twenty feet on each side. *It is covered with trophies, and in each* corner is an eagle holding in his talons a wreath of oak, which extends from the one to the other all round. Inside the pillar is a spiral staircase cut out of the marble blocks, and leading to the summit by one hundred and eighty-four steps; light being admitted by forty-three apertures.

We have now to describe the most curious and the most remarkable part of this column, namely, the bas-reliefs which cover the shaft, running round it in a spiral band, which makes twenty-two revolutions in passing from the base to the capital. The subjects of these bas-reliefs are the victories of Trajan in his Dacian campaigns. The whole number of figures sculptured is about two thousand five hundred; the figure of Trajan himself is repeated more than fifty times. At the lower part of the column the human figures are about two feet in height; as they ascend, and thus become further removed from the eye, their size is increased, till at the top of the column they have nearly double the height that they have below. As a matter of course the height or width of each bend of the spiral increases similarly. These bas-reliefs are executed with great delicacy and spirit, but they possess for us a high value of a different kind.

The Roman dress and manners may receive considerable light from these bas-reliefs. We find the soldiers on march generally bare-headed. Each of them carries a stick over the left shoulder for carrying provisions. They wear upon their legs a kind of light pantaloon, reaching a little below the knee, and not buttoned. The Dacians have loose pantaloons, reaching to the ancle and shoes; they also carry curved swords. Their horses are without saddles, and those of the *Germans* without either saddles or bridles. There is a bridge of boats, in which the boats are without rudders, but are guided by an oar fastened with a thong on one side of the stern. Victory is represented as writing with a pen upon a shield.

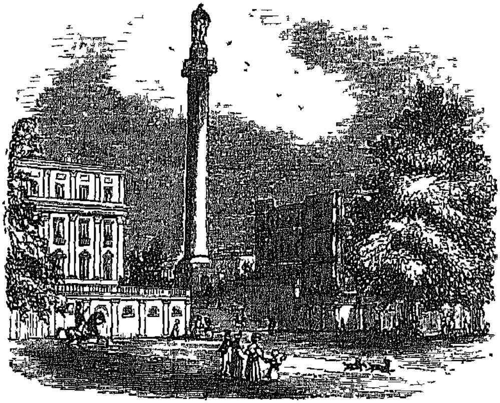
"It may be said (we quote from the '*Letters of an Architect*,') that one column of this sort is very much like another, and that there is very little room for the merit of the architect; but if you were to go two or three times to the column of Antoninus, and return to that of Trajan, you would feel the great superiority of the latter, though it might puzzle you not a little to find out in what that superiority consisted. This magnificent column must always have been conspicuous as it is now, rising above the Basilica and all the buildings of the Forum; but the pedestal could hardly be seen, except from the confined little court in which it stood. This apparent disproportion is one of the secrets of effect in architecture. You show large and lofty edifices from large spaces it is true, but then you should also endeavour sometimes to bring great things into contrast with little spaces. Nothing impresses the idea of size more strongly; and when again you see the edifice from a larger space, perhaps over the tops of smaller buildings, the imagination carries on the idea of size to all its accompaniments."

This column was situated in the Forum of Trajan, which is often spoken of as having been the most wonderful of all the wonders of ancient Rome. It was the work of the celebrated architect Apollodorus. It occupied the space between the Capitoline and Quirinal hills; and within its circuit were a palace, a gymnasium, a library, triumphal-arch, porticos, &c., many of which were ornamented with equestrian statues and military ensigns gilt—some of them spoils of the Dacian wars. Its whole length is supposed to have been eleven hundred and fifty feet, and its general width four hundred and seventy feet. Along the sides were rows of columns. At one extremity, stood the temple of Trajan; on the opposite side a triumphal-arch; and about the centre, the large and splendid Ulpian Basilica. The whole of its area, even that part exposed to the open air, was paved with marble. Of all these monuments, the column is the only one which has survived.

THE PILLAR OF THE PLACE VENDOME, PARIS.

This column is formed on the model of that of Trajan. It was commenced in 1806, by order of Buonaparte, and finished in 1810, at an expense of a million of francs. It is formed of stone, and entirely cased with brass, furnished by the guns taken from the Austrians by Buonaparte. The column is about one hundred and forty feet high, and thirteen feet diameter; and from the pedestal commences a series of bas-reliefs, which wind round the column spirally, until they reach the top. The bas-reliefs are executed on brass plates, two hundred and seventy-six in number, each measuring four feet by three; the subjects represented being the principal events in the campaign of 1805. A statue of Buonaparte was placed on the top: this was removed by the Allied Powers in 1814, but restored to its place in 1831.

THE YORK COLUMN.



The York Column was erected in honour of the Duke of York in Carlton Garden's, St. James' Park. It is of the same height as Trajan's Pillar at Rome, viz., one hundred and twenty-four feet; *the height of the figure is about fourteen* feet; the whole altitude from the ground-line at the top of the steps, which lead to St. James' Park, to the summit of the figure is one hundred and thirty-eight feet; from the bottom of the steps one hundred and fifty-six feet. The foundation on which this enormous weight of column and statue-rests, is in form about two-thirds of a pyramid, the base of this pyramidal mass being a square of fifty-six feet, and its top a square of thirty feet. The task of raising the statue to its present position was one of some difficulty. A vast quantity of scaffolding had been fixed round the pillar, and to some height above it; strong cordage and chains were fastened under the arms, and about the body of the statue. It was then gradually elevated by ropes which went round pulleys at the top, and were worked by four machines below, on the principle of the windlass On reaching the top of the column, it was powerfully secured by bars; strong iron cramps, which had been fixed throughout the body, and projected to some length from each heel, were let into holes prepared to receive them, and were there firmly soldered.

The Duke is represented, as he should be, in the modern costume, with a cuirass and military boots. Over his left shoulder is thrown an ample mantle, on which is emblazoned the Order of the Garter. It is placed in one of the best situations in the metropolis.

POMPEY'S PILLAR

STANDS on a small eminence near Alexandria. It is of red granite; but the shaft, which is highly polished, appears to be of earlier date than the capital or pedestal. The centre part of the cap-stone has been hollowed out, forming a basin on the top; and pieces of iron still remaining prove that it was once ornamented with a figure, or some other trophy. It is remarkable that while the polish on the shaft is still perfect to the northward, corrosion has begun to affect the southern face, owing probably to the winds passing over the sands in that direction. Its substructure was once evidently under the level of the ground, and formed part of a paved area, the stones of which have been removed, leaving only those beneath the column itself, to the great risk of the monument. It is to be regretted that the protection of the Egyptian Government has not been so far extended to this interesting relic of ancient Alexandria, as to prevent its pedestal and shaft being defaced by the names of persons who have visited it, or of ships that have anchored in the port, some of which are painted in black letters of monstrous height. The total height of the column is ninety-eight feet nine inches; and the shaft is seventy-three feet; the circumference twenty-nine feet eight inches; and the diameter at the top of the capital sixteen feet six inches.

The name is believed to be a misnomer. The inscription states that it was erected by Publius, the Prefect of Egypt, in honour of Dioclesian; so that it may be looked upon as a silent record of the capture of Alexandria by his arms, A.D. 296, when the rebellion of Achilleus had obliged him to lay siege to the revolted city; and the use of the epithet "*invincible*," applied in the inscription to the emperor, favours that opinion. This memorable siege, according to the historian of the Decline, lasted eight months; when "wasted by the sword and by fire, it implored the clemency of the conqueror, but experienced the full extent of his severity."

The operation of forming an open ladder to ascend the column has been performed several times of late years, and is very simple. A kite was flown, with a string to the tail, and when directly over the pillar, it was dragged down, leaving the line by which it was thrown across the capital. With this a rope, and afterwards a stout hawser, was drawn over; a man then ascended and placed two more parts of the hawser, all of which were pulled tight down to a twenty-four-pounder gun lying near the base (which it was said Sir Sidney Smith attempted to plant on the top); small spars were then lashed across, commencing from the bottom, and ascending each as it was secured, till the whole was complete, when it resembled the rigging of a ship's lower masts. The mounting this solitary column required some nerve, even in seamen; but it was still more appalling to see the Turks, with their ample trowsers, venture the ascent. The view from this height is commanding, and highly interesting in the associations excited by gazing on the ruins of the city of the Ptolomies, lying beneath.

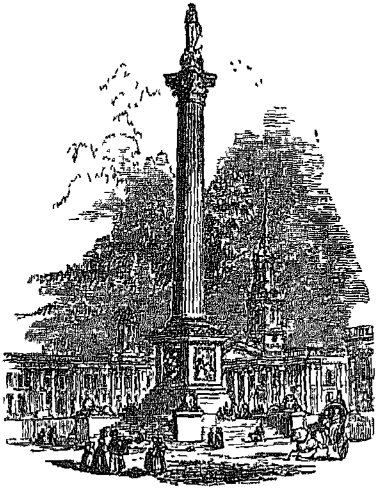
THE ARCH OF TITUS.

The Romans erected arches in honour of those who had been conquerors or benefactors. The oldest existing arch of this kind is that of Titus, erected, as an inscription records, by the senate and people of Rome, in honour of the conqueror of Judea. It is now in a state of great dilapidation, having been nearly destroyed for the sake of its rich decorations, and the white marble with which the whole is cased is become black with age. It consists of a single arch, originally adorned with eight marble columns of the composite order, of which this arch has generally been supposed to afford the earliest specimen. The interior is decorated with sculptures, representing on one side Titus in his car of triumph, conducted by the Genius of Rome, and crowned by the hand of Victory; on the other, spoils of the Temple of Jerusalem, the seven-branched candlestick, the trumpets, the golden table, with the show-bread, and the vessel of incense, with a train of captive Jews. But of all the arches in Rome,

THE ARCH OF CONSTANTINE

Is the most noble because the best preserved. It owes its chief beauty, however, to the spoliation of the Arch of Trajan, which stood in the Forum of the emperor. It consists of a arge arch between two smaller ones, ornamented on each side with four fluted Corinthian columns, supporting the figures of eight Dacian captives. Some of the bas-reliefs on the one front, represent the triumphal entry of Trajan into Rome—the repair of the Appian-way—his measures to supply Italy with provisions—and Partomasides imploring the Roman emperor to restore to him the kingdom of Armenia, which had been taken from his father. On the opposite front, we find Trajan declaring Partenaspartes king of Parthia—the discovery of a conspiracy formed against him by Decebalus, king of Dacia—his harangue to the soldiers, &c. On the two sides there are two bas-reliefs representing the victory gained by Trajan over Decebalus. The eight round medallions on the two fronts relate to the sports of the chase, of which Trajan was fond, and to sacrifices offered by him to various deities. Of the sculptures contemporary with the arch, those at the bottom relate to the conquest of Verona, and to the victory over Maxantius at *Ponte Molle*. A line of bas-relief goes all round the arch, exhibiting military processions and similar spectacles. Two more round medallions, one on each side, represent chariots of the Sun and Moon, emblematical of the East and West. The soil which had accumulated round the arch was removed by order of the reigning pontiff, in 1804, when part of the pavement of the *Via-triumphalis* was brought to light. A staircase on the one side leads up to a chamber in the arch, filled with fragments of marble, which have apparently lain there ever since the arch was erected. The grass-grown platform at the top was once probably occupied by the victor in his triumphal car. And this is in imperial Rome. Imperial, alas! no longer: these arches evidence not its triumph, but its decline and its decay. A triumphal arch below the morn! If there be a triumphal arch, it is that soft blue rolling sky so like eternity; for from horizon to horizon it spans the earth, an infinite unknown; smiling as if in defiance of chance or change!

NELSON'S MONUMENT.



THE highest column in London (the Monument excepted) is Nelson's Monument. It is a noble erection, one hundred and seventy-seven feet high. It was erected in 1843, from a design by William Railton, at a cost altogether—including the granite statue of the hero, by Baily, and the bronze bas-relief on the four sides of the base, which represent the "Death of Nelson," by Carew; the "Battle of the Nile," by Boddington; the "Battle of St. Vincent," by Watson; and the "Battle of Copenhagen," by Ternonth—upwards of £28,000. It is one of the finest monuments of the kind ever erected.

THE BELL-ROCK LIGHTHOUSE.

ON the Eastern coast of Scotland, near Arbroath, is a ridge of rocks which the hardy mariners of the Northern seas had long ample reason to regard with fear. It lies in the very heart of a very busy and active trade. Tradition had given to this rocky mass, the name of the Bell Rock, from the monks of Aberbrothock having caused a bell to be placed on it, which, when washed by the waves, warned the mariner of his danger. Southey has alluded to this tradition in one of his minor poems—

> "When the rock was hid by the surge's swell,
> The mariners heard the warning bell,
> And then they knew the perilous rock,
> And blest the Abbot of Aberbrothock."

The Bell Rock was both broader and of softer material than the Eddystone, and it was not considered so safe as a site for a lighthouse. In the external figure, and in the general modes of dovetailing, Rennie, who undertook to build a lighthouse on it, had the model of Smeaton to follow, which he did, with some improvements suggested by the situation. It occurred to him to make the building itself contribute to the preservation of the mass on which it stood. "By extending the base," he said, in his design, "and imparting a greater degree of concavity to the beautiful curve assigned to the external figure by Smeaton, the impulse of the waves on the structure will not only be diminished, but their action on the rock adjoining the foundation will be rendered much easier; so that when the waves break upon the building they will spend their fury upon the lighthouse' base, instead of the rock itself." In the lower part of the structure granite was used, and in the upper part, sandstone. The manner of dovetailing was nearly the same as Smeaton's, though the forms of the dovetails were suited in some degree to the peculiar forms of the stones as they came from the quarries. Above the staircase, however, and in the habitable parts of the building, an entirely new mode of securing the walls was contrived. Instead of cramps, the ends of the stones comprising each course were dovetailed together, and every horizontal course was prepared with a raised belt upon the upper surface of a stone, to suit a corresponding indentation made in the lower surface of the stone to be placed upon it. But the greatest improvement effected by Rennie was in the floors. At the Eddystone, they were virtually domes, which exercised a great side pressure upon the walls. Rennie contrived to render the pressure perpendicular. Even in the dome of the roof of the highest apartment, now denominated the library, all the stones being made to repose on perfectly horizontal beds, and the hollow concavity of the dome itself being formed by allowing the successive courses to overlap. This important and interesting structure was begun in August, 1807, and on the 1st of February, 1811, the light was for the first time exhibited. The tremulous motion sometimes felt at the Eddystone is also experienced at the Bell Rock, whenever the building is struck by heavy seas in particular directions. It is, however, as imperishable as the rock itself on which it stands.

A few other lighthouses off the British coasts are remarkable either on account of their position or construction. The *Longships* Lighthouse is built upon an almost inaccessible rock, scarcely presenting sufficient surface for the tower, about three miles off the Land's End. The lighthouse on the Mull of Kintyre, on the coast of Argyleshire, is perhaps one of the most desolate habitations in the civilized world. The rock on which it is built rises two hundred and forty feet above the level of the sea, from which it is from the most part inaccessible. Behind it, the mountain range rises much higher, so as to render it very difficult to approach by land. With the exception of a solitary shepherd's hut, there is not a human dwelling nearer than five miles. Of foreign lighthouses, the most distinguished is the *Tour de Corduan*, situated on an island at the entrance of the Garonne, about three miles from the shore. It was finished in 1610, and affords a signal instance of inappropriate architecture. It is a richly-decorated structure, covering a space of one hundred and forty-five feet in diameter, and rising to an equal number of feet in height.

IRON LIGHTHOUSE IN JAMAICA.

THIS may be called the iron age, for we have iron roads, iron bridges, iron statues, iron boats, iron houses, and iron lighthouses. The suggestion of iron lighthouses originated a few years ago with Captain Sir Samuel Brown, who proposed to place a lighthouse on the Wolf Rock, near Land's End, where it would be exposed to the most violent Atlantic storms. A stone one was proposed which would occupy fifteen years in construction, and cost £150,000. Captain Brown undertook to construct one of bronze, ninety feet high, for £15,000, and to complete it in four months. It was not, however, accepted. In 1842 the plan was tried in the erection of a lighthouse at Morant Point, in Jamaica, and was successful. In less than three months from the date of the contract, it was cast and erected on the contractor's premises, and in a similar space of time, re-erected on its final destination. The light is ninety-six feet above the level of the sea;

and the whole elevation of the tower is one hundred and three feet To preserve as low a temperature as the climate and other circumstances will permit, the iron shell is lined with a non-conducting material. To preserve the two lower tiers from rusting, they are coated with tar. The tower itself is painted white. The whole of the castings were executed at the foundry in Pimlico. The entire weight of the iron-work was about one hundred tons. Three mechanics were sent out with the work to put it together. The whole expense, including the freight across the Atlantic, was about £7000.

The situation of the keepers seems somewhat perilous at first sight, being suspended in mid-air on the top of a pillar, which appears little more than a tall rod. Their condition has been thus described:—"Cooped up in a cage, one-half of whose floor projects over the sea, or standing on a gallery which hangs over it completely, they live for months together without exchanging words or thoughts with their fellow mortals. There they pass the dark stormy nights with the winds howling, and sea-birds shrieking around them, while the abyss foams and rages below, and the slender stem that bears them above it quivers under their feet when struck by the angry surge, or beaten by the tempest. No situation can be conceived more dismal and monotonous, or more beset with terrifying circumstances. Such, however, is the force of habit in reconciling men to outward circumstances, which appal at first sight, that the inmates sleep secure, though lullabied by storms and tempests, the aspect of which in such a situation would drive a greenhorn landsman mad."

THE HOLYHEAD LIGHTHOUSE

Is erected on the summit of an isolated rock, three or four miles westward from Holyhead, and separated from the mainland by a chasm ninety feet in width. This splendid structure was raised in 1808. The elevation of the summit of the rock on which it is erected is one hundred and forty feet above the level of the sea at high-water mark; the height of the tower, from the base to the gallery, is sixty feet; and the lantern is twelve feet high from the gallery; making the total elevation of the light two hundred and twelve feet above high-water mark. The light is produced by twenty-one brilliant lamps, with powerful reflectors, placed on a revolving triangular frame, displaying a full-faced light every two minutes, which, in clear weather, is distinctly visible at a distance of ten leagues. Latterly there has been an addition of three red lights placed at the rock, which are more distinctly visible in foggy weather than the lighthouse lights. The rough sea caused by the strong tides about the head, rendered the communication by boat very precarious. In order to obviate the danger, a passage was contrived by means of ropes thrown across the gulf, along which the individual was drawn in a box or cradle, by the assistance of pulleys affixed at each end. This plan was superseded by a bridge of ropes, which was used some years after, though always considered unsafe, on account of the constant wear of the ropes. In 1827, a modern suspension-chain bridge was thrown over the sound, the span of which is one hundred and ten feet, the chains being firmly bolted in the rock on each side, and carried over two massive stone pillars erected for the purpose. The chain supports a platform of timber five feet wide, and seventy feet above high-water mark. The bridge is attained by descending the Holyhead mountain in a zigzag direction, by a flight of three hundred and eighty steps.

THE EDDYSTONE LIGHTHOUSE.

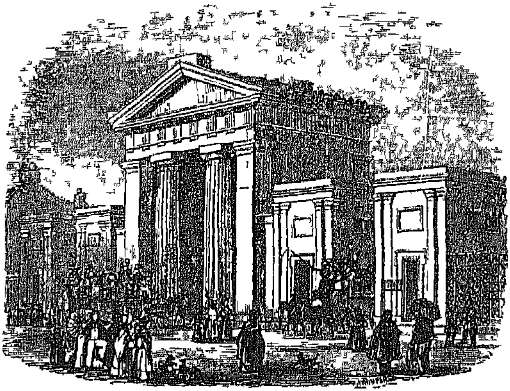
Lighthouses are by no means of modern invention. The most famous building of the kind in the ancient world was that on the island of Pharos, at Alexandria. The most celebrated in modern times is that on the Eddystone rocks, in the English Channel. The peculiar position of these rocks exposes them to the great swells of the Bay of Biscay and the Atlantic Ocean; and there are some circumstances connected with the rocks themselves which augment the fury of the waves. After hard gales of wind in the Bay of Biscay have been succeeded by a perfectly calm and unruffled sea, such is the effects of the *ground-swell* upon the peculiar slope of these rocks, that, to quote the words of Smeaton, "the sea breaks upon them in so frightful a manner, as not only to obstruct the work that might be done upon them, but even to prevent a landing; and this at times, when, figuratively speaking, you might go to sea in a cockle-shell."

The first attempt to raise a lighthouse on the Eddystone rocks was made by Mr. Winstanley, in 1696, and took four years for completion. During the first summer, the only season during which the rock is accessible; twelve holes were bored in the rock to admit as many iron cramps. In the second year a solid pillar, twelve feet in diameter and fourteen in height, was built as a nucleus for the future tower, which in the following year was so far raised as to have a light exhibited. This edifice remained unharmed till 1703, when the builder, having visited it to superintend some repairs, expressed such confidence in its strength, that he wished he might be shut up in it during the most violent storm which ever blew under heaven. His desire was too fully gratified. A hurricane arose on the 26th of November, and on the following morning not a vestige of the lighthouse remained excepting some of the irons which cramped it to the rock. In July, 1706, a second lighthouse was commenced by Mr. Rudyard, a London silk-merchant, who was a man of great mechanical skill. It was constructed principally of wood, and for forty-nine years defied the fury of the water, unhappily to perish by a not less dangerous element, viz., fire, communicated from the lantern to the lower timbers. Chased successively from room to room the inmates at last found refuge in a cavity of the rock. One of them, while looking up at the cupola of the lantern, was covered with a shower of melted lead, some of which he declared passed into his stomach, in which, on his death twelve days afterwards, seven ounces of lead were found. This extraordinary fact was communicated to the Royal Society by his medical attendant.

It was thought that the safety of Rudyard's building had, in a measure, depended upon the *elasticity* of its materials, which enabled it to yield to the violent shocks of the sea. But Smeaton thought that the structure required *weight* rather than elasticity, remarking, "If the building I propose will not give way to the sea, the sea must give way to the building." For the form of the building he takes the oak for his model, considering that it was partly by its figure that that tree was enabled to resist the fury of the storm. Instead of cramping the stones, he imitates the joiner in *dovetailing* them. To apply this principle to a structure of this kind was novel and difficult. Much labour must have been bestowed by him before his system was so complete as to enable him with confidence to say, the strength of his building was in part proportionate to the strength it had to bear; for it was eternally rung in his ears from all quarters that a building of stone would never be found to stand, so was he anxious so to unite all its parts together, that "no man should be able to tell at what joint it would overset."

Our limits will not permit us to describe the successive steps by which the different courses of masonry were raised; the difficulties and delays which continually impeded his operations; the skill and perseverance with which they were surmounted, from the landing of the first stone, until the whole was triumphantly crowned by the lantern and ball at the height of ninety-four feet. Smeaton was a devout man; and the inscription he caused to be sunk in one of the granite courses of his noble edifice, "Except the Lord build the house, they labour in vain that build it," affords a beautiful proof of the principles and feelings that animated him. There is, however, an interesting circumstance, which his pure and genuine modesty has not allowed him to insert in his work. On the morning after the completion of the Eddystone, with all his assistants, artificers, and workmen around him, he in a short and simple address, informed them, that, having by the mercy of God, completed their great undertaking, without any serious accident, it was his desire to return thanks to the Author of all good, and led his men accordingly to the parish church of Plymouth for that purpose. On his last visit to the rock, in 1787, he said, "I am now so perfectly satisfied of the stability of the edifice, that I think nothing but a convulsion of Nature can destroy it." From the citadel of Plymouth he watched with composure a great storm which took place soon after its completion. With a telescope he followed the rolling of the sea, till, as he says, "one overgrown wave would strike the rock and building together, and flying up in a white *column, would enwrap it like a sheet, rising to at* least double the height of the house, totally concealing it from view, and descending, after its fury was exhausted, like a *jet d'eau.*" The year 1762, however, produced a tempest of so extraordinary a character, as to make one of the prophets of evil, who had used to predict downfall, assert, "that if the Eddystone lighthouse survived it, it would stand till the day of judgment." It did triumphantly survive; and Smeaton remarks that "from that day its safety has been so entirely out of men's minds, that, whatever storms have happened, no inquiry has ever been made concerning it."

RAILWAY TERMINUS.



One of the most remarkable buildings in London is the Euston Square Railway Station. This stupendous undertaking, originally called the London and Birmingham Railway, was the first railway station erected in the metropolis, having been completed in 1838. The extensive range of buildings for the immense passenger traffic, is approached through a noble Propyleum, or architectural gateway, having four lodges connected with it, intermediate to which, and in connection with the whole, are large, lofty, and ornamental gates, cast by J. J. Bramah. The Propyleum is from the designs of Philip Hardwicke, Esq, and is a most successful adaptation of the Grecian Doric. The extreme length of the entrance is upwards of three hundred feet, and its total cost was £35,000. The columns of the main entrance are higher than those of any other building in London, measuring from the pavement to the top of the columns, forty-four feet two inches; the diameter at the base being eight feet six inches.

The public hall, erected in 1849, is also from designs by Philip Hardwicke, Esq, and is a noble apartment, one hundred and twenty-five feet six inches in length, sixty-one feet four inches in breadth, and sixty feet in height, having a gallery all around it. The walls are in imitation of granite; the ceiling is panelled, deeply recessed, fully enriched, and connected with the walls by boldly designed ornamented consoles. At the northern end of the hall, a bold flight of steps, ornamented with large columns, in imitation of red granite, leads to the general meeting-room, over the door of which is a sculptured group, by Mr. John Thomas, representing Britannia, with Mercury and Science, on either side. In the angles are eight alto-relievos, by the same artist, symbolizing London, Birmingham, Manchester, Chester, Northampton, Carlisle, Nottingham, and Liverpool.

The general meeting-room, is a handsome saloon, forty-five feet wide, and forty feet high, having a coved and pannelled ceiling. It is calculated to accommodate four hundred persons comfortably.

The board-room, adjoining, is thirty-four feet six inches long, by twenty-seven feet two inches wide, wainscotted, adorned with Corinthian columns, and contains an immense map of all the railways under the control of the board. The entire cost of these buildings, was £125,000.

THE DEE RAILWAY VIADUCT

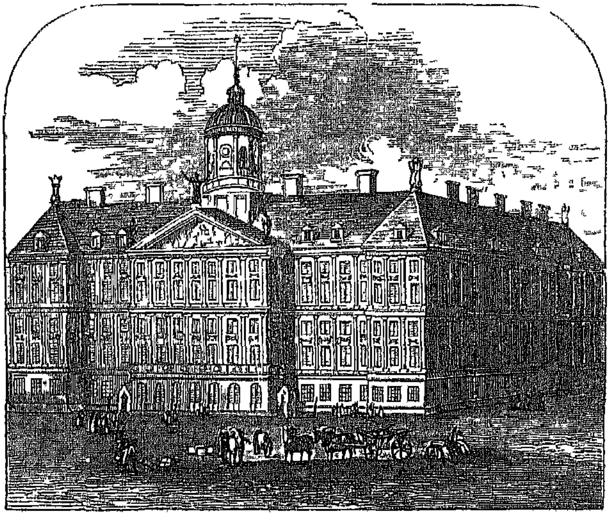
Is a noble specimen of engineering and architectural skill; thoroughly British in design and execution, destitute of all tawdry ornament, but grand in its simplicity, and at once massive in its strength and beautiful in all its proportions. Its length is 1518 feet, its height 147 feet, the number of arches 19, and the span of each arch 60 feet. The cost of this magnificent structure, which is built entirely of fine white stone, was about £100,000. Viewed from a gentle eminence on the south-west of the viaduct, or from the shingly bed of the river on the south-east bank, it presents a remarkably fine appearance, revealing through each of its lofty arches enchanting glimpses of the Arcadian panorama in which it is situated. From the viaduct, the varied prospects are exceedingly beautiful and imposing, including in their glorious range the noble woods of Wynnstay, the elegant aqueduct of Cysylltau, the meandering course of the Dee, rippling in streams of living silver among the verdant foliage which clothes its picturesque banks, vales of green luxuriance stretching out at the base of the eternal hills, which there lift their heads in tranquil majesty over scenes of surpassing grandeur and loveliness, forming a climax, as it were, to the sweet succession of pictures, "ever charming, ever new," which the railway in its course from Chester is constantly developing. Few districts combine in so short a space so great a variety of ancient and modern objects of interest.

THE STONES OF VENICE.

Venice was the City of Palaces; and though its glory has departed, "the stones" remain to attract the admiration of the traveller. It is situated on *seventy islets* of the Adriatic, partly on the rock, partly on piles sunk into the sea, with a canal instead of a pavement for all its streets. Scarcely is there room left for a foot passenger; the gay Venetian is conveyed in the gay Gondola from palace to palace. Thus Venice appears rising from the water, with its numberless domes and towers, and attended by several smaller islands, each crowned with spires and pinnacles, presents the appearance of a vast city floating on the bosom of the ocean. The row of magnificent but decaying palaces which extend along the grand canal, with their light arabesque balconies and casements, their marble porticos, and peculiar chimnies, present one of the *most superb and wonderful scenes in the world. They stand* in majesty of ruin, and exhibit the most affecting combinations of former splendour and present decay. The church of St. Mark rivals in splendour any edifice in Italy or in Europe. It glitters with gold, gems, and marbles. The interior is enriched with the spoils of Constantinople and the East, the monuments of long ages of glory. The Rialto, a bold marble arch thrown over the most magnificent part of the grand canal excites universal admiration. The ancient residence of the Doge, the *ducal palace where the state inquisitors used to sit, is adorned* with the finest works of the Venetian painters. But, alas! that genius and energy which raised these edifices in a swampy marsh, and opened such scenes of grandeur in the middle of a pool, is now no more. That bold independence which filled a few lonely islands, the abode of sea-mews and of cormorants, with population and commerce, is bowed into slavery; and the republic of Venice, with all its bright triumphs, is now an empty name. The city, with its walls, and towers, and streets, *still remains; but the soul of the city is dead—crushed under* Austrian despotism.

THE ROYAL PALACE AT AMSTERDAM.

This noble edifice, although now called a palace, was originally built as the Stadt Huis, or Town Hall of Amsterdam. It is called by the people of Amsterdam the eighth wonder of the world. Its architect was James Van Campen, under whose direction the work was completed in seven years, from 1648 to 1655. The most wonderful fact about it, is that it rests on a foundation of thirteen thousand six hundred and eighty wooden piles In length it is two hundred and eighty-two feet; in breadth, two hundred and thirty-five feet; and in height, one hundred and sixteen feet; whilst its tower rises to an altitude of one hundred and fifty-seven feet. That side which fronts the Dam, a fine square in which the palace stands, has seven doors, originally intended for the representatives of the Seven United Provinces, but now reserved exclusively for the royal family. Its exterior is ornamented by pilasters of the Composite and Corinthian Orders; and in front there is a pediment, containing a marble sculpture, representing the city of Amsterdam, as a female with a crown on her head and an olive-branch in her hand, attended by Neptune, with his usual train of Naiads and Tritons, and surmounted by three colossal statues, of Peace, Prudence, and Justice. Its interior, contains a grand saloon, formerly the *Burger-zaal*, or Citizens' Hall. It is one hundred and twenty feet in length, sixty feet in breadth, and one hundred feet in



height; eighty feet of this height being lined with Italian marble, adorned with pilasters of the Corinthian order, and ornamented with sculptures of corn, fruit, and flowers. It contains also, some fine statues, and all these things, combined with its marble floor, and otherwise rich decorations, have gained for it the credit of being the finest room in Europe. The other rooms are ornamented with some very fine sculptures and paintings, amongst which may be noticed that over the secretary's apartments, in which his fidelity, is represented by a famished dog watching over the body of his murdered master; and his secrecy, by a figure of Silence, with her finger on her lips. Over the apartment, formerly devoted to commissions of bankruptcy, is a significant sculpture representing a man overturning a chest, and the rats running out of it. In the strong rooms on the ground floor, formerly used as the bank, were at one time deposited treasure to the amount of £40,000,000.

WONDERFUL TOWERS.

THE PORCELAIN TOWERS AT NANKING.

Of all the artificial curiosities in China, their stately towers are the most striking. There are two of these without the walls of Nanking, the most beautiful of which, constructed of porcelain, is the most admired for its height, symmetry, and variety of carving, gilding, and other ornaments. It is of an octagonal form, nine stories, or two hundred feet high, and forty feet in diameter; so that every side is fifteen feet in length. The whole is built on a large basis of brick, strongly cemented, which forms a stately flight of nine or ten steps, by which you ascend to the first story. Every story has glazed windows, one at every front. They all lessen as they mount one above the other, so as to form, in the whole, a kind of cane, or sugar-loaf: and between each of them is a projecting roof, lessening in the same proportion the higher they rise. Each room is adorned with paintings, and other ornaments, after the Chinese style, both on the sides and on the ceiling, whilst the outside is embellished with a variety of work in bas-relief niches and imagery. But the most beautiful part of the whole fabric is a kind of cupola, which rises thirty feet above the uppermost story, and is supported by a thick mast, fixed at the bottom of the floor of the eighth story. This piece seems to be inclosed in a large iron hoop, all the way, which winds round it like a spiral line or screw, at the distance of several feet, so that the whole looks like a hollow cave rising in the air, and supporting on the top a golden ball of an extraordinary size. Such is the structure of that famous tower, which is looked upon by Le Comte and others, as the best contrived, most solid, and magnificent work in the East.

THE TOWER OF THE WINDS AT ATHENS.

THIS is an octagonal tower of marble, originally about fifty feet high, which was surmounted by a brazen Triton (no longer to be seen) holding a wand in his right hand. This Triton served as a weathercock, and turned on an axis by the power of the wind—pointing with his wand to the quarter whence the wind blew. To indicate what part of the compass that might be, a figure was sculptured in bas-relief, on a frieze, on each of the eight sides of the tower; which figure was emblematical of the kind of weather which generally prevailed during the continuance of that kind of wind at Athens. Under these bas-reliefs are eight sun-dials all vertical in position, but different in their construction according to the side on which they are placed. D'Alembert, the celebrated French Mathematician, has determined the construction of these dials to be rigorously correct, and to evince a complete knowledge of the principles of construction. In the pavement of this tower have been observed channels cut, as if for the flow of water; and it has been conjectured that they were connected with clepsydra used for the indication of time at those hours and seasons when the sun-dials were not available. Thus, this tower was in various ways available for showing the points of the compass, the direction of the wind, the hour of the day, (and most probably the seasons of the year) by sun-dials, as likewise the hour by a clepsydra. It is all strongly indicative of the ingenuity of the ancient Egyptians.

THE LEANING TOWER OF PISA.

ANY high building is wonderful; and the kind of wonder which it generally excites is that of surprise, that, being so high, it does not fall. Much more wonderful then must be a tower which has been falling for six hundred years without having reached the ground! Such is the fact in regard to the celebrated Tower of Pisa. It is one hundred and eighty feet high, and the top is fourteen feet further out than the base! It appears, therefore, as if in the act of falling. Whilst approaching the city (which is situated on an extensive plain) at the distance of a few miles, the effect, when the tower is seen over the tops of the trees, between two others which are perpendicular, is so striking, that the spectator feels almost inclined to doubt the evidence of his senses.

It is ascended by three hundred and fifty-five steps, and contains seven bells, being, in fact, the belfry of the Cathedral, though standing apart from it. It is built of marble and granite, and has eight stories, formed of arches, supported by two hundred and seven pillars, and divided by cornices.

It was erected about A.D. *1174, and seems to have with*stood the ravages of time with more than usual success, being still without any fissure, or perceptible sign of decay. There is a difference of opinion as to the cause of its singular position, some believing that it was *accidental,* and others that it was *intentional.* In some old figures, the now leaning tower is *upright.* This seems to settle the matter, and it is confirmed by the circumstance of the lowest row of pillars being sunk deep in the earth. The ground at Pisa, and all around it, is rather wet and swampy, and may easily have yielded under edifices of such elevation and weight. It would appear however that it began to sink before it was finished, and that the architect, notwithstanding so alarming a symptom, had the courage to continue the work, and the skill to counteract its consequences. This is inferred from the observation, that the uppermost story diverges much less from the perpendicular line than the others, and seems to have been constructed as a sort of counterpoise. Whatever cause, however, produced the effect, the result equally evinces the solidity of the edifice and the skill of the architect, for there it stands,

> And, wondrous to behold,
> Stands ever firm, though threatening still to fall.

THE LEANING TOWER OF SARAGOSSA.

Is an object of considerable interest in the town of that name. It was erected in 1594, and is used as a belfry. In use and appearance, therefore, it resembles the Pisan tower, just described. It is rather lofty, the ascent to its top being by two hundred and eighty steps; and from the upper balcony a *noble prospect is gained. The style of its architecture is* pretty and ornamental; and the material employed in its construction is brick. "At first sight of this tower (says a traveller) the question, 'How it came so?' instantly occurred to us; but we found it not so easy to obtain a solution, for the critics of Saragossa are as much divided in opinion as those of Pisa; and though their tower is not so old by four centuries, the cause of its declination is involved in equal perplexity." From the position, however, of the stones, there can be no question that the building has sunk on one side.

Saragossa is famous for its siege, in regard to which Southey says, "there is not, in the annals of ancient or of modern times, a single event recorded more worthy to be held in admiration now and for evermore." On the morning following their arrival, the French attempted to storm the city, but were repulsed, as they were also nine days afterwards, when they renewed it. The city was fortified only by the bodies of the inhabitants. Every house was a castle, and every man a soildier. Yea, women of all ranks assisted. The Countess Burita organized and headed a corp of ladies, for assisting in defence of the city. Young, delicate, and beautiful, in the midst of the most tremendous fire of shot and shells she was to be seen at her post. The French, however, having advanced inch by inch till they had obtained possession of half the town, the French general proposed to the governor to capitulate in the following brief note: "Head-Quarters, St. Engracia. Capitulation." The reply of the Spaniard was equally laconic. "Head-Quarters, Saragossa. War to the knife." For many days longer the fight continued, till ultimately the besiegers were obliged to retreat from a city which all the rules of war declared to be untenable!

THE LEANING TOWERS OF BOLOGNA.

ARE in a similar position to that of Pisa, and appear as if they were about to fight, if the simile is not too gross. One of them has been immortalized by a simile, for Dante compares it to the stooping giant Antæus. The taller of the two, that of the Ansinelli, was built A.D. 1109. Its height is about three hundred and fifty feet. It has no external beauty, but rewards the traveller for a tedious ascent of five hundred steps by an extensive view of the surrounding district and neighbouring cities. The smaller tower, that of Garisendi, is one hundred and forty, or one hundred and fifty feet in height, and deviates from the perpendicular about seven or eight feet. The wood-work and masonry incline as well as the total elevation, which is sufficient to prove that its inclination is owing to the same cause as that of Pisa. Similar falling towers are to be found elsewhere, and two to be seen in England may be mentioned.

THE FALLING TOWER AT CAERPHILLY

CASTLE, Glamorganshire is the most remarkable. Indeed, in proportion to its height, it is much more inclined from the perpendicular than any other in the world, of which we can find an account, for it is only between seventy and eighty high, and yet eleven feet out of the perpendicular. It rests only on part of its south side, held together principally by the strength of its cement. The singularity of its position is best observed by looking at it from the inside, or from the moat immediately underneath it, from whence the effect of the apparently falling mass is most extraordinary. The cause of the inclination is not a little singular. The unfortunate King Edward II. and his favourites the Spencers were besieged in Caerphilly Castle by the Queen and Barons in 1326. The defence was long and bravely conducted, and the besiegers were particularly annoyed by melted metal being poured on them. This was heated in furnaces at the foot of the tower, and either from ignorance or design the besiegers threw water upon it from the moat, which caused a violent explosion, tore the tower from its foundation, and hurled it into its present position. The solidity of the wall is amazing, the only rents now visible having been caused by the explosion.

THE FALLING TOWERS, BRIDGENORTH

CASTLE, in Shropshire, and at Corfe Castle, in Dorsetshire, were placed in similar positions by the use of gunpowder in the Civil war.

THE LEVIATHAN, OR GREAT EASTERN STEAM-SHIP.

PERHAPS the best way to afford an adequate conception of the vastness of this monster of the deep is at once to submit a table of the relative dimensions of the largest steamers now afloat, reminding our readers that in the year 1838, the Great Western, which stands lowest on the scale, was considered the "Leviathan" of its time; that there were great difficulties in getting her out of the port of Bristol, where she was built; and that thousands of persons, even of practical experience, then deemed her proportions enormous and unmanageable :—

RELATIVE DIMENSIONS OF CELEBRATED STEAMSHIPS.

	Length. Ft.	Breadth. Ft.
Great Western, 1838 (first Atlantic steamer)	236	36
Great Britain, 1844 (first ocean screw steamer)	322	51
Himalaya, 1853 (largest screw steamer)	370	44
Persia, 1856 (largest paddle steamer)	390	45
Duke of Wellington, 1855 (largest war steamer)	240	60
Leviathan, or *Great Eastern*, 1858	680	83

The enormous bulk represented by these dimensions requires a corresponding power to overcome the resistance of wind and tide; the Leviathan is therefore fitted with both paddle and screw propellers, and is the first vessel in which the two systems of steaming have been united.

The *paddle wheels* are 56 feet in diameter, and their weight is 185 tons. The floats or paddles are 13 feet by 3 feet, and thirty in number to each wheel.

The *screw propeller* is 24 feet in diameter, and 44 feet pitch. Its four fans may be compared to the bladebones of some huge animal of the pre Adamite world. The weight of the screw is 36 tons. The propeller shaft, destined to move the screw itself, is 160 feet in length and weighs 60 tons. The after length of this shaft is 47 feet long, and weighs 35 tons. The other lengths of the propeller shaft consist of different pieces, each 25 feet long and 16 tons weight.

The *paddle engines* are of the following dimensions:—

Horse power	1,000	Length of stroke	14 ft.
Number of cylinders	4	Strokes per minute	14
Diameter of each cylinder	74 in.		

The weight of one of the cylinders, including piston and piston rod, is 38 tons, or more than seven times the weight of the great bell of St. Paul's.

The combined paddle engines work up to an indicator power of 3,000 horses of 33,000 lbs. when working 11 strokes per minute, with steam in the boiler at 15 lbs. upon the inch. The engines are so constructed and proportioned that they will work safely and smoothly at 8 strokes per minute, with the steam at 25 lbs. upon the inch. Under these last named circumstances, the paddle engines alone will give a power of about 5,000 horses.

The *screw engines* are the largest ever made for marine purposes. There are four of them, each complete and independent of the others. Their power and dimensions are:—

Horse power	1,600
Number of cylinders	

Diameter of each cylinder	84 in.
Length of stroke	4 ft.
Number of revolutions per minute	50

The combined screw engines work up to an indicator power of 4,500 horses of 33,000 lbs. when working at 45 strokes a minute, with steam in the boiler at 15 lbs. and the expansion valve cutting off at one-third of the stroke. They are, however, made to work smoothly either at 40 strokes per minute, with steam at 25 lbs., without expansion, or at 55 strokes per minute. Under these circumstances they will be working at the tremendous power of 6,500 horses.

Take, then, the highest power of the paddle engines at 5,000 horse, and the highest power of the screw engines at 6,500 horse, and we obtain the maximum of *eleven thousand five hundred horse power.*

There are four *paddle engine boilers,* each weighing about 50 tons, and containing 40 tons of water. They are tubular boilers, manufactured of wrought plate iron, with brass tubes of 3 inches diameter. There are ten furnaces in each boiler, five on either side, and two boilers in each boiler room.

The *screw engine boilers* are similar to those for the paddle engines, but a trifle larger and heavier. They are ten in number, and the whole are so arranged that all or any of them can be used with either set of engines. The weight of the screw engines and boilers is 1,500 tons.

The *coal bunkers* are on either side, above and between the boilers, and capable of containing 12,000 tons of coal.

The estimated consumption of coal per day of 24 hours is about 180 tons. Therefore some 5,000 tons would be consumed in the outward voyage.

The *anchors* are ten in number, which with their stocks weigh 55 tons, and require 800 fathoms of chain cable, weighing 98 tons; her capstan and warp weighing 100 tons. Thus we see that this steam monster requires *a total weight of two hundred and fifty-three tons to make her fast.*

The *passenger accommodation* amounts to 800 first class, 2,000 second class, and 1,200 third class, independently of the ship's complement, about 400. The series of saloons, together with the sleeping apartments, are located in the centre of the ship, and extend over 350 feet. The passengers are completely isolated from the machinery by a strongly arched roof of iron, above which, and below the lowest saloon deck, the coals are stowed, preventing sound and vibration from penetrating to the upper stories.

Upon an emergency the Leviathan can convey 10,000 troops, allowing to each man the same accommodation as he would be provided with on board an ordinary troopship.

The *tonnage* of the Leviathan is 18,500 tons register. There are two large holds, one at each end of the cabins, devoted exclusively to cargo. Each is 60 feet long, and capable of holding about 1,000 tons of cargo. It is quite easy to stow 6,000 tons in the hold and various other places.

The *crew* amounts to about 400: of which one-third belong to the engine department; another third consists of cooks, stewards, servants, &c.; and the remaining third of sailors.

Such are the wonderful features of this gigantic work of human skill and enterprise.

The *conception* of building so gigantic a vessel is due in part to the lamented I. K. Brunel, assisted by Mr. Scott Russell. Brunel proposed that the ship should be large enough to carry coals sufficient for the longest voyage, and it was his suggestion to use two sets of engines, and to combine the paddle and screw propellers. Russell designed the lines of the vessel, and constructed the iron hull of the ship.

WONDERFUL BRIDGES.

In common with many other of the most useful inventions, the origin of bridges is veiled in impenetrable obscurity. By whom they were first built, and in what manner the earliest bridges were constructed, are now mere matters of conjecture, and lie beyond the reach of authentic and chronological history. After providing food, dwelling-places, and garments, one of the first wants of which society would be sensible, would be some means of crossing the streams and brooks by which it was surrounded, and *natural* bridges, consisting of trunks of trees which had fallen across a rivulet, or masses of rock which had got wedged into mountain fissures, would present models for the stimulation of the inventive faculty, and bridges of simple construction would soon be built. Stepping-stones in shallow rivers, covered with planks from stone to stone, exhibit the incipient principles of piers and arches, which science has brought to their present wonderful perfection.

Tradition assigns the invention of bridges to Janus; and on several Greek, Italian, and Sicilian coins, representations of ships, crowns, and bridges occur in company with a Janus having two faces. There is no mention of a bridge in the Old Testament; and the earliest historical record of a bridge is that which Herodotus gives of the one constructed by queen

Nitocris, over the Euphrates at Babylon Diodorus relates that this bridge extended to the extraordinary length of five furlongs; but Rollin, without good grounds for so doing, has cast adrift this statement, by affirming that the Euphrates at Babylon did not exceed one furlong in width.

With the Greeks, who were more a maritime people, and accustomed to navigation, there is no doubt, but that ships and boats preceded, if not superseded, the use of bridges. In their brightest days, when their fine style of architecture was complete, when their porticos were crowded with paintings, and their streets with statues, the people of Athens waded over the Cephisus for want of a bridge. The Greeks do not seem to have valued the construction of the arch sufficiently, to have excelled in bridge-building, and must yield the palm of merit in this department of architecture to their successors. No people of the ancient world carried the power of rearing stupendous arches, and magnificent vaults and cupolas, to such an extent as the ancient Romans. It was a work which harmonized with their martial spirit, just as statuary bespoke the refined texture of the soul of Greece. After the construction of their great sewers, their aqueducts, and their cupola over the Parthenon of M. Agrippa, a bridge over the Tiber was of early execution, and the invention of the architecture of stone bridges, as practised in its best and most effectual manner, should be conceded to this energetic and indefatigable people.

NATURAL BRIDGES.

The natural bridges which demand notice here, as ministering to the idea of the Wonderful, are exceedingly few. Rocky archways, and natural tunnels, formed by the continued action of the sea waves, which by friction alone are continually cutting away the rocky boundaries on which they beat; or by the action of land-springs, the waters of which contain acids that act upon the rocks near which they flow, or by sudden convulsions of nature, are common in all mountainous districts, and wherever the land confronts the sea, in bold escarpments and elevated headlands, and more particularly where the prevailing rock is limestone.

THE NATURAL BRIDGE AT VIRGINIA

Is situated in Virginia, the largest state in the American Union. A chain of mountains, called the Blue Ridge, divides the state of Virginia into two parts nearly equal in extent. The portion of the state to the west of the Blue Ridge, is an extensive and fertile valley of limestone formation, principally watered by one stream, the Shenandoah, which unites with another, the Potomac, at a place called Harper's Ferry. This part of the united rivers takes its course through a wide opening in the mountain chain, on each side of which the mountains rise in some parts very abruptly, and their rugged faces and the shattered appearance of the whole of this magnificent channel show evident traces of a violent disruptions. The feature of chief curiosity, however, is in the valley of Shenandoah, a few miles on the west side of the Blue Ridge, and consists of a natural bridge of rock, arching over a small stream in the upper part of the great valley. It is known as Rock-bridge, and gives its name to the county in which it is located, which is called the county of Rock-bridge.

In his "State of Virginia," Mr. Jefferson describes this remarkable phenomenon as commencing at the ascent of a hill, which seems to have been cloven asunder by some convulsion of nature, and to be formed of limestone rock coated over in many places with deposits of fertile soil. The bridge itself forms part of the ordinary road-way, and after passing a piece of rough stony road with a few stunted firs and scrub oaks on the right hand and the left, the traveller perceives that the slope of the hill is interrupted by a deep and sudden descent; and on going nearer to the right side of the road, he finds himself on the edge of a tremendous precipice. At the bottom, a small stream is seen making its way amidst broken rocks. Going to the opposite side of the road, and looking down there, he will observe the little river continuing its course, in a deep channel down a narrow valley. The traveller is now on the Natural Bridge; he is standing on a stupendous arch of limestone, and though he may form some conjecture of his situation by looking down from the edge of the precipice, he can have no adequate conception without viewing it from below. The arch is best seen from the bed of the rivulet, and from a point just under it. On looking up you behold a noble arch of one solid mass of stone, hanging over your head, somewhat curved in its highest part, and almost like the work of man. The same native rock forms, on each side, the supports of this enormous arch, which is from eighty to ninety feet wide at the top, and about forty-five feet wide at the bottom: the whole height, from the outer top of the arch to the water is about two hundred and ten feet, as ascertained by measurement with a string and a stone at the end. The thickness at the summit of the arch is about forty feet, and on the summit grow many large trees which find support in the soil which ages have accumulated there. Here then is a solid framework of stone built up by the agencies of nature, which exceed in height the Monument of London; its structure is sound, its architecture massive and imposing, and its material of that enduring nature which fits it for the convenience of many ages to come. And yet, whatever causes may have combined to hew out an arch of this size and shape from a solid wall of rock, it seems pretty certain that it has not been produced by any sudden or violent cause, but by some slow agency, working perhaps through many centuries, and exhibiting at any one period of its history, scarcely any more striking display of power than that which is possessed by a ceaseless dropping of water on a stone. A mountain spring may perhaps have bored the first fissure, and the steady friction of a confined stream passing through a confined channel may have completed a work which now justly ranks in the catalogue of the wonderful.

Like many other great works in nature and art, it is not the first sight of this bridge that produces the deepest impression. On a second visit its grandeur and massive proportions are seen more accurately, and beneath it the visitor may sit and gaze for hours with increasing astonishment at the majestic arch which nature constructed before man begun his work, and which seems likely to outlive the most durable of his movements. The stream that runs beneath this bridge is called Cedar Creek, and from the limestone above drops of water filter through and drop in quick succession, and from the time occupied in their descent, their increasing velocity, and their full bright appearance, afford to the eye a measure of the height from which they descend, and increase materially the beauty of the scene. Another natural bridge in Virginia, situate in Scot county, is worthy of note, as reaching a height of three hundred and forty feet, but it is inferior in point of completeness to the one just described.

The chain of the Andes in South America presents most striking natural phenomena in the immense clefts, or *crevasses* as they are sometimes called, which separate two contingent masses of mountain, and in some cases these are near five thousand feet deep. If Mount Vesuvius were plunged into one of these frightful abysses, its summit would not reach to the peaks of the highest rocks on each side, while the bottom of the cleft would be only one fourth less elevated above the level of the sea than the passes of St. Gothard and Mount Cenis in the Alps.* The valley of Iconowzo is one of the

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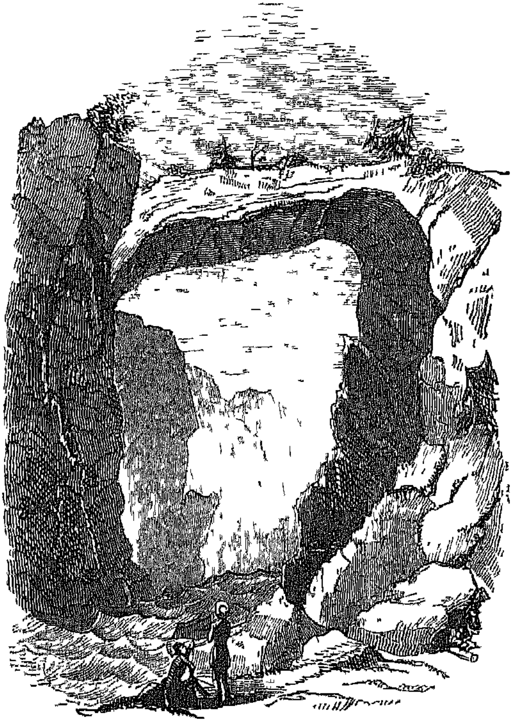
* Humboldt, "Vue des Cordillèrs."



NATURAL BRIDGE AT VIRGINIA.

most interesting of these defiles less for the magnitude than the peculiar form of its rocks and for the remarkable structure of the two

NATURAL BRIDGES OF ICONOWZO.

The naked and arid summits of the rocks form a most picturesque contrast with the tufts of trees and herbaceous plants which cover the borders of the *crevasse.* A little torrent has made itself a way through the valley, and lies sunk in a channel, which is so difficult of approach that the river would hardly be passable if nature herself had not provided these two bridges, which have all the appearance of having been cut by the hand of man, and are justly regarded as the greatest curiosity in that country. Humboldt and Boupland crossed these natural bridges in 1801, on their route from Santa Fè de Bogota to Popayan and Quito.

In the valley of the Iconowzo, the *grés* or sandstone is composed of two distinct kinds of rock—one very compact quartz ore without any marks of stratification—the other a fine-grained sandstone, formed of an infinite number of thin and almost horizontal layers We may imagine that the compact material resisted the force which rent the mountains asunder, and that it is the unbroken mass of this rock which forms the bridge by which the traveller now crosses from one side of the valley to the other. This natural arch is about forty-seven and a-half feet long, forty-one and a-half wide, and about eight feet thick in the centre. By very careful experiments made on falling bodies, with the assistance of a good chronometer, combined with the measurement obtained by a plummet, it appears that the height of the upper of the two natural bridges, above the level of the torrent, is about three hundred and thirteen feet. Sixty feet below this first natural bridge, there is another, formed by three enormous masses of rock, which have fallen in such a way as to support one another. The centre rock forms the key of the arch.

The last instance we shall mention under this head is the

NATURAL BRIDGE OF AUGARAEZ,

Situate in the province of Augaraez, in South America. As described by Don Ulloa, it is from sixteen to twenty-two feet wide, one hundred and eleven feet deep, of breadth one and one-third of a mile, and not sensibly greater at top than at bottom. Don Ulloa thinks it has been effected by the wearing of the water which runs below it; if so, it would doubtless have worn down plain and smooth, or most to that side on its descent where the rock was of softer materials. But he says that the cavities on one side so tally with the protuberances on the other, that if they met they would fit in all their indentures, so as to leave no space void; from which the conclusion seems easy, that the bridge has been built by earthquake forces, and perhaps formed in a few seconds by a great and sudden convulsion in its present form and completeness.

WOODEN BRIDGES.

In the progress of the mechanical arts the adoption of timber as a material for the construction of buildings, bridges, forts, and other works, always prevails before the use of stone or metals. In the early history of a people, timber is more abundant, and the inventive faculty being yet in its infancy, a material so accessible, so easily adapted to the purpose required, and calling for so few elements of engineering skill, readily supplies the need of a youthful civilization, and contributes to its prosperity and advancement. But when population has encroached on the limits of the primitive forests, and the increased demand for building materials has almost exhausted the natural supplies, the art of construction has advanced so far, that more obdurate materials can be safely and expediently employed, and more endurable and stately structures of stone arise, and the metals, iron especially, soon become popular as materials for the engineer. Hence in the history of bridges, wooden structures are the earliest, as they are also the simplest; though from their perishable nature, and the limited amount of constructive skill usually called forth in their erection, the examples are but few in which they rise into the region of the wonderful.

The account given by Julius Cæsar of the wooden bridge which he threw over the Rhine, will be remembered as one of the mistakes of the conqueror, whose fame rests on military and not mechanical achievements. It was clumsy and unscientific in the extreme; and although the earliest work of the kind figuring in the pages of history, its fame would never have sufficed to have perpetuated the name of its builder. It is far otherwise with the celebrated

TIMBER BRIDGE OF SCHAFFHAUSEN,

Which was erected in 1758, by a self-taught genius—a working carpenter of the name of Ulric Grubenman. The rapid current of the river having gradually undermined the piers of a stone bridge at that place, it fell down in 1754, and it was resolved to supply its place by one of timber, as requiring fewer piers, and therefore not being liable to the same source of destruction. Grubenman offered a model of a bridge requiring no pier at all; but his design being considered too daring, the authorities insisted on one pier of the old bridge, which was intentionally left standing, being used as an intermediate support. The artist accordingly modified his design and the bridge was built, apparently in one span, from shore to shore; but additional strength was given by beams springing from the pier in question. The length of the bridge was three hundred and sixty-four feet, its breadth eighteen feet. It was not in a straight line on the plan, but formed a very obtuse angle towards the current. The bridge was an enclosed gallery—the sides consisting of the framing of the complicated trusses necessary to support such an arch; and there was a roof over the roadway resting on these sides. This beautiful and wonderful work was needlessly destroyed by the French in 1799, when retreating before the Archduke of Austria. The act of destruction is characterized by Alison as one of "needless barbarity;" who also speaks of the bridge as "the most perfect specimen of that species of architecture that existed in the world."

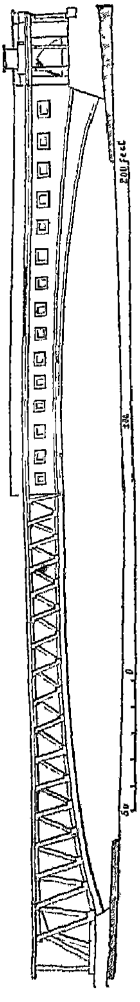
Grubenman had a brother John, no way inferior to himself in mechanical talent. This man, about the same time, erected a wooden bridge on the same principle at Ruichenau, two hundred and forty feet in length; and the two brothers united their talents to build similar structures in various parts of Germany. One of these joint erections was thrown over the river Limmat, near Baden, and was two hundred feet in length. Another bold and well-constructed bridge, built on the same principle, was erected at Writtenghen. The curve of this bridge was the segment of a circle of three hundred and forty-eight feet in diameter, whose chord measured one hundred and ninety-eight feet, its versed sine thirty-one feet, and the height of the timber frame-work of the arch at the vertex seven feet five inches. Wiebeking, another German, has erected numerous beautiful timber bridges in his native country since the commencement of the present century. He designed one of six hundred and ten feet span, with a versed sine of only twenty-six feet, the timber framing at the vertex to be only four feet deep.

In America, where timber is superabundant, that material is frequently used for constructing bridges on the largest scale. The earliest was built by Palmer over the Piscalazua, near Portsmouth, in 1794 of two hundred and fifty feet span. There is another at Trenton, near Deleware, built by Burr in 1804, of two hundred feet span, of thirty-two feet rise, the depth of framing being only two feet eight inches at the vertex. But the

TIMBER BRIDGE OF SCHUYLHILL,

In Philadelphia, justly deserves the name given to it of the "the Colossus," as exceeding all others in the span, which is no less than three hundred and forty feet, with a rise of only twenty feet, and a depth of seven feet in the vertex. This stupendous arch was constructed by Wernwag in 1813; it consists of three equal and similar ribs, each composed of seven thicknesses of planks, thirteen inches wide, and six inches thick, and to the proper curve, and the joints are alternated like those of masonry, to ensure strength. Each rib carries a trussed frame, the two outer ones of which constitute the sides of the bridge; the roadways between are roofed over, and as the whole is planked externally, the bridge is an enclosed gallery, lighted by numerous windows on each side; a simple lodge, or portico, at each end, contributes to the architectural beauty of this singular and simple work, which is in no way inferior to its mechanical. There is another bridge over the same river, of a similar construction, but consisting of three arches, the centre one, one hundred and ninety-five feet span, the others one hundred and fifty-one. It is equally elegant as an object in the landscape, though less imposing than the former.

From the facilities for rapid construction afforded by timber, many temporary bridges have been constructed for the passage of armies across deep streams, and numerous terrible conflicts were enacted on bridges of this temporary nature, or on permanent structures of timber, during the last European war. Napoleon neglected none of the accessories of military power, and while his career was marked with bloodshed and tyranny, it was almost equally notable for the great public works of a beneficial kind, which made progress



THE TIMBER BRIDGE OF SCHUYLHILL.

under his auspices and encouragement. During the first twelve years of his occupation of the consular throne, that is from 1800 to 1812, the sums expended on public improvements in France amounted to the enormous sum of a thousand millions of francs, or £40,000,000, of which 31,000,000 francs, or £1,240,000 was spent on bridges alone.

None knew better than he the value of such works, and there are few similar instances on record, which excel in interest the engineering tactics adopted by Napoleon in the course of his military manœuvres and campaigns. One striking example of his skill is afforded in the

BRIDGES OF THE DANUBE,

Three of which were erected to connect the island of Lobau with the right bank of the Danube, and in addition to those was a fourth, which ran across all the islands from shore to shore, over an extent of two hundred and forty fathoms. The year 1809 was remarkable, among other events, for the campaign of Wagram, when the political as well as military position of Napoleon was full of peril, and when one single mistake, one additional defeat, would have entailed upon him certain ruin. But it was precisely in such circumstances that his genius shone forth with the brightest lustre, and that he was most likely by a sudden blow to reinstate his affairs, and overturn all the calculations of his enemies. The battle of Aspern, in which the French were driven into the island of Lobau on the Danube, electrified the inhabitants of Europe, and every hope was expressed that the victorious Austrians, under the Archduke John, would immediately assail them there and make the conquest complete. Though the French had sustained heavy losses, an immense force remained in their hands; and from the correspondence of Napoleon with Berthier, it appears that in the beginning of June the Grand Army numbered no less than one hundred and ten thousand infantry, twenty-four thousand horse, and four hundred pieces of cannon; in all, including artillerymen, one hundred and fifty thousand combatants. This was independent of the corps of Marmont, in Dalmatia, and Vandamme in Bavaria, of Lefebre in the Tyrol, and of Macdonald in Spain; and after deducting for the sick and absent, one hundred and eighty thousand men could be assembled in a month's time under the walls of Vienna. The force at the command of the Austrians was not very considerable: fifty thousand of the warriors engaged in the last conflict remained unhurt, Kollowrath might bring up twenty thousand more, and it was hoped that thirty thousand veteran troops would be added from the Hungarian plains.

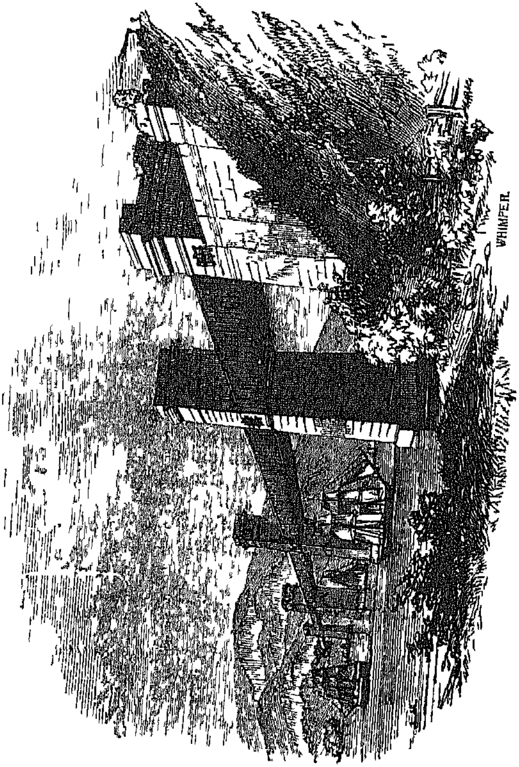
"While remaining in a state of apparent inactivity at Schonbrunn," says Alison, "Napoleon's attention was chiefly directed to three objects. First, the converting the island of Lobau into a vast fortress, rendered impregnable by a plentiful array of heavy artillery, and connected with the right bank [of the Danube] by strong bridges, from whence he might at any moment issue forth to attack the Archduke Charles, and at the same time find a secure refuge in case of disaster. Next, the securing and keeping open his communication with the Rhine, by means of a chain of posts, occupied by strong detachments, and a skilful disposition of the troops of the Rhenish Confederation, under Lefebre, Bernadotte, and Vandamme, all along the menaced districts in the valley of the Danube. Lastly, the clearing his right flank of the enemy, and driving the Archduke John still farther into the Hungarian plains, and throwing back upon the left flank the corps which the Austrian generalissimo was pushing forward to endeavour to open a communication with the Italian army . . . . The works in the island of Lobau were of the most gigantic description, and still remain an enduring monument of the great designs of the Emperor Napoleon, and the persevering energy and skill of his engineers. Never, since the days of the Romans, had constructions so vast been erected in the presence of an enemy. Three solid bridges connected that island with the right bank of the Danube; and in addition to these, a fourth ran across all the islands from shore to shore, over an extent of two hundred and forty fathoms. The most extraordinary pains were taken to render this bridge secure against the misfortune which had befallen the former one. Immediately above the bridge of boats was one on piles, which served as a barrier both against the violence of the current, and the machinations of the enemy: and close adjoining to it, on the other side, one on pontoons, which also contributed to the strength of the whole and served as an additional line of passage for the columns of infantry and light chariots. Both extremities of these bridges were fortified by strong *têtes-du-pont;* that on the northern end, where it was exposed to the attacks of the enemy, soon became a complete fortress, with rampart, wet ditches, ravelins, and lunettes, armed with eighty pieces of heavy cannon, drawn from the arsenal of Vienna. All the prominent points of the intermediate islands were also fortified and mounted with artillery; and boats were collected and manned by marines brought from Brest, by the provident foresight of the Emperor, before the opening of the campaign, to be in readiness to intercept and turn aside any fire-ships or loaded barks that might be directed against that bridge by the enemy. The Emperor was indefatigable in urging forward these important operations. Every day, for the first fortnight, he was to be seen in the island of Lobau, animating the men, conversing with the engineers directing the works; and such was the vigour which his presence and exertions inspired into his followers, that in a fortnight after the battle of Aspern, the fortifications were beyond the reach of the enemy's attack, *and in a month they were entirely finished.*

"Immense as these preparations were, it was not to them alone that the Emperor trusted for the grand operation of crossing the river He was well aware that such gigantic works would speedily fix the attention of the enemy; and he daily beheld rising before his eyes vast intrenchments running through Essling and Erzendorf, by which the Austrians hoped to bar the entrance to the Marchfield from the bridge, and confine the enemy within the fortifications they had constructed. Like the vast armament of armed gun-boats collected in 1805 on the shores of the Channel, these great operations were intended only to mask his hidden designs, and conceal from the enemy the real point of attack. While these prodigious bridges and fortifications attracted all the attention of the Austrians to the anticipated passage in front of Essling, there were secretly collected, in one of the narrow channels of Lobau, in a situation entirely concealed from the enemy, the materials for three other bridges over the narrow arm of the river which separated that island from the northern bank, and which were so constructed that they could be transported and put together with extraordinary celerity. One of these bridges was composed of a single piece, sixty fathoms in length; the second, of the materials of the old bridge which had given way on the 22nd May, reconstructed with more skill; the third, of boats and pontoons drawn from the arsenal at Vienna. The first of these bridges was justly considered so wonderful a piece of art, that a model of it is still preserved in Paris, in the Hall of the Conservatory of Objects of Art. The intention of the Emperor was, that these bridges should be thrown across the arm of the Danube which separates Lobau from the opposite shore, considerably further down than the great bridge in front of Essling, and in such a situation as to take all the Austrial defences in the rear. Thus the three fixed bridges from the southern bank to the island of Lobau, secured the passage of the troops and artillery into that important station; the great bridge from thence to the *tête-du-pont*, on the northern bank, attracted all the attention of the enemy to that point, while the movable bridges, prepared in secret behind, were adapted to throw the troops speedily across, in a situation where they were not expected, and where they would find themselves in the rear of the whole Austrian entrenchments. To cover the latter design, and at the same time to distract the attention of the enemy, preparations as if for a passage were made both at Nussdorf and Spitz, on the upper part of the river above the islands, while the whole semicircular shore of the island of Lobau, fronting the northern bank, was lined with heavy artillery drawn from the arsenal of Vienna, and a hundred and twenty pieces of cannon, disposed on every headland along the wide circumference, were prepared to cover the formation of the new bridges, and bewilder the Imperialists by their wide-extended fire."

This catalogue of events requires no further illustration: Davoust failed in his endeavours to force a passage at Presburg; the battle of Raab was fought on the 14th of June, and the French, after a bloody massacre, retrieved their fortunes again; and after numerous desperate struggles and flying combats, the campaign was closed by the subjugation of the Austrians, and by an armistice signed on the 18th of July, the flames of war were quenched in Germany; only, however, to break out with more fearful violence three years afterwards upon the banks of the Niemen.

THE BRITANNIA TUBULAR BRIDGE.

There is probably no locality in the British Empire which combines so grand a variety of picturesque scenery, and so splendid an exhibition of mechanical genius, as the locality of Bangor and the Menai Straits, where the magnificent glories of mountain and marine scenery, and the wondrous triumphs of science, alike invite the attention. The Tubular Bridge is, indeed, a wonderful monument of human ingenuity. To carry the railway across the Straits was an enterprise of almost insuperable difficulty, and would have been perhaps impracticable, had not Robert Stephenson's plan of a tubular bridge been attempted. He came to the conclusion, that a tube, or tunnel of wrought iron, large enough for the passage



THE BRITANNIA TUBULAR BRIDGE.

of trains, would be the most feasible plan, embracing safety for the navigation, and creating no delay to the transit of the railway carriages over the Straits. The tube would be 900 feet in length, supported at the centre in a piece of masonry about 100 feet high, erected on the Britannia rock. The ends would not be jammed as in the case of an arch, but left free so as to admit of expansion in the metal arising from the change of temperature. The practicability and safety of this novelty in engineering science, were attested by competent persons, and the plan was ultimately sanctioned by Parliament.

The operation of floating the first of the four immense tubes which cross the waters of the Straits, took place on June 20, 1849. "In our inspection of the previous arrangements," says a witness, "we had the advantage of being accompanied over the works by an assistant engineer, whose intelligent explanations, not only of the divers mechanical operations in progress, but of the principles on which the whole structure is founded, gave additional interest to our visit; and gave us confidence in the stability and safety of this novel invention of ærial tunnels. The rapid facility with which the rivets were put into the holes red-hot, and thus made, by the force of contraction in cooling, to add to the strength of the structure (and of these rivets the bridge will contain no fewer than two millions), the singularly interesting appearance of the interior of the tube, with sun-light streaming through a long vista, whose perspective resembles the dim aisles of a cathedral—the extensive apparatus of the various forges—the massive coils of ropes, two miles long—the massive and ingeniously contrived scaffoldings and platforms—the colossal majesty of the towers, looking more like the architecture of the land of the Pyramids, than of modern Britain—the bewildering and almost fearful view of the chasm below from those lofty elevations, with the rushing of the tide, the shouts of human voices, and 'clink of hammers closing rivets up'—all produce a combined sensation of delight, wonder, and awe, which requires a calmer view of the verdant woods, and the solemn hills, of that lovely district, to tranquillize."

The particular spot at which the Britannia Bridge crosses the Menai Straits, is exactly a mile nearer to Carnarvon than the Suspension-bridge. The shores are of the same precipitous and shelving character at both places; but the stream is wider here than at the Suspension-bridge, being about 1100 feet across at high water. It is divided nearly exactly in the middle by the Britannia rock, which at high water is covered to a depth of ten feet. The rise and fall of the tide is ordinarily twenty feet, and its velocity very great, often as much as eight miles and a quarter an hour. It is from the Britannia rock that the bridge takes its name, the centre pier being based upon it. The stone of which the towers are built, is a hard, carboniferous limestone or marble, called Anglesea marble; it abounds in fossils, and is capable of receiving a very high polish. Some specimens of it are very handsome. *Some of the stones in the work are no less than twenty feet* in length, and others weigh from twelve to fourteen tons. A great portion of the interior masonry, however, is built of red sandstone. The stones in the towers are all left with a rough or quarry face, except at the angles or in the recesses, and the entablature at the top. This circumstance, coupled with their immense size and height, gives the towers a truly noble appearance. The approaches to the bridge are ornamented on each side by colossal statues of lions, in the Egyptian style. They are composed of eleven pieces of limestone, and although in a couchant attitude, are twelve feet in height. Their length is 25 feet, and their weight about thirty tons. Being associated with so many other large objects, their real size is not apparent. It was once contemplated to surmount the centre tower with a figure of Britannia in stone, sixty feet in height; but the idea is, for the present, abandoned.

The entire structure consists of two immense wrought-iron arcades, tunnels, or tubes, each considerably upwards of a quarter of a mile in length, placed side by side, through which the up and down trains respectively pass. The ends of these tubes rest on abutments, the intermediate portions being supported across the Straits by three massive and lofty stone towers. The centre tower, as has been observed, stands on a rock, which is covered by the tide at high water. The side towers stand on the opposite shores, each at a clear distance of 460 feet from the centre tower. The abutments are situated inland, at a distance of 230 feet from the side towers.

The Britannia tower is 62 feet by 52 at the base; it has a gentle taper, so that where the tubes enter, it is 55 feet by 45. Its total height from the bottom of the foundations is nearly 230 feet! *It contains 148,625 cubic feet of limestone, and* 144,625 of sandstone, weighing nearly 20,000 tons; and there are 387 tons of cast iron built into it, in the shape of beams and girders. The land towers are each 190 feet in height from high-water; they contain 210 tons of cast-iron in beams and girders. The bridge, as we have seen, is divided into four spans, viz., the two small spans at each end, which are over the land, and which are each 230 feet wide; and the two principal spans, which are over the water, and are each 460 feet wide. The span of the small tubes, as they are termed, is vastly greater, however, than that of any other railway bridge in existence, the Conway tube alone excepted. The small tubes, being constructed on their platforms, did not require any removal. The large ones, being constructed on timber platforms along the beach, on the Carnarvon shore, required to be removed, and elevated to their final position on the towers. To these, consequently, the principal interest attaches.

The length of one of these tubes, as constructed on the platform, was 472 feet; that is, 12 feet longer than the clear span between the towers. This additional length was intended to afford a temporary bearing of six feet at each end, after they were raised into their places, until there was time to form the connection between them across the towers. Our London readers will better appreciate the great length of these tubes, by remembering, that IF ONE OF THEM WERE PLACED ON END IN ST. PAUL'S CHURCHYARD, IT WOULD REACH 107 FEET HIGHER THAN THE TOP OF THE CROSS!! The span, in fact, is much greater than has ever before been attempted, except in bridges on the suspension principle. The length of the iron arch of Southwark bridge, the largest rigid span in this country, is but 240 feet.

Each tube contains about ten miles of angle and T-iron, and the whole bridge sixty-five miles. The weight of the wrought iron in one of the large tubes is estimated at about sixteen hundred tons, of which five hundred are in the bottom, six hundred in the sides, and five hundred in the top. The weight of one large tube is about eighteen hundred tons. To those unaccustomed to the estimation of weight in tons, we *may observe that this weight is fully as great as that of thirty* thousand men! It is not easy to conceive how machinery could be made strong enough to raise such a ponderous burden. The weight of each of the small tubes is about six hundred and sixty tons; so that the weight of iron in the whole eight tubes amounts to nearly ten thousand tons.

Each tube, built on the shore, had to be transported from the position it occupied during erection, to that between and at the base of the towers, upon large flat-bottomed close barges, called pontoons, of which eight were used to a tube. They were arranged under the tube in two groups of four one near each end. Large valves were placed in the bottom of each boat, which were kept constantly open, and in this state the tide entered and left them daily without producing any buoyant effect. The operation of floating the tube was commenced by closing all these valves at low water; as the tide rose, the pontoons began to float, and shortly afterwards bore the weight of the tube, which was at last raised by them entirely off its temporary supporting piers; about an hour and a half before high-water, the current running about four miles an hour, it was dragged out into the middle of the stream by powerful capstans and hawsers, reaching from the pontoons at each end to the opposite shore. In order to guide it into its place with the greatest possible certainty, three large hawsers were laid down the stream, one end of them being made fast to the towers between which the tube was intended to rest, and the other to strong fixed points on the two shores, near to and opposite the farther end of the platforms; in their course they passed over and rested on the pontoons, being taken through "cable-stoppers," which are contrivances for embracing or gripping the hawser, and thereby retarding, or, if necessary, entirely destroying the speed induced by the current. Numerous steam-boats were also in attendance to give their assistance. The speed and time of floating were so arranged, that when the tide became stationary, before turning, which it does for fifteen minutes, the tube had just reached the tower, and in this interval it had to be deposited on the projecting shelves at the foot of the towers, exactly under its final position; this was the most difficult part of the whole operation. As before-mentioned, the tube is twelve feet longer than the distance between the towers; in order to receive this additional length, recesses or grooves were left in the face of each tower, six feet deep, and of sufficient width to allow the ends of the tube to slide up easily within them. These recesses extended from the bottom to the top of the towers. Now, in order to get the tube within these recesses, the low end of it which was near the land tower, had to be thrust twelve feet past the side of the tower, thus allowing the opposite end of the tube to be inserted into its recess. In order to deposit the low end in a similar manner, a portion of the masonry at the side of the recess was left out, to allow the tube to pass under it into the recess; this had to be subsequently built up before the tubes could be raised. As soon as this operation of floating was accomplished, the valves in the pontoons were opened, the water entered, destroying their buoyancy, and the tube settled quietly down on a bed of soft timber placed to receive it!

The final adjustment was a very delicate piece of work, as the width of the recess into which the end of the huge mass had to be inserted was only an inch greater than that of the tube itself; however, it was managed with complete success. The whole operation occupied exactly one hour and three quarters. On the tube with Mr. Stephenson were his two assistants, and Mr. Brunel and Mr. Locke, who acted as his honorary assistants, Captain Paxton, and Sir Francis Head. There was a general gathering of engineers, and a vast concourse of spectators, who lined the shores and platform on both sides of the Straits, and whose enthusiastic cheers, mingled with repeated discharges of artillery, announced the completion of the process.

The accidents during the great trial were few. One man broke his thigh, two fell into the water, while another had his nose taken off by a piece of iron. Had the tube, the only fear, jilted over, it would have fallen on some fifty men on the pontoons, who must inevitably have been killed. A number of life-belts were provided in case of accident. The machine used to effect the lifting of the tube was the hydraulic press—a contrivance invented by Bramah, and extensively used in this country in expressing oils, packing soft materials, and in many operations where an intense pressure is required. Its construction is very simple, though we must not at present go out of our way to explain it. The one used at the Brittannia Bridge was the largest in the world, and is, indeed, the most powerful machine ever constructed, and if worked to its utmost power, would be alone quite capable of raising one of the tubes. *Its action, nevertheless, is guided and controlled by one man, with the most perfect precision and ease.*

The tubes, when all raised, were joined at their ends, so that, as before stated, they form two tubes, each upwards of a quarter of a mile long. The exact length of each tube is one thousand five hundred and thirteen feet, and weight *five thousand tons*, in size far surpassing any part of wrought iron-work ever before put together, and in weight nearly *double that of a 120-gun ship ready for sea!* The junction of the tubes adds most materially to their strength, so much so, indeed, that startling as it may at first appear, the bridge would stand securely even if the large tubes were to be cut through in the middle of the span. The parts which pass through the towers are very much strengthened with this view.

The entire length of the bridge at the rail level is one thousand eight hundred and forty-one feet. The expansion and contraction of so great a mass of metal, from changes of temperature, is of course, very considerable; the extreme variation in the length of one of them, between summer and winter, being nearly twelve inches. Provision is made for this constant alteration of length, which would otherwise endanger the stability of the whole structure. In fact, the tubes are as sensitive as a thermometer, alternate sunshine and showers causing them to expand or contract. It is calculated that the wind at a velocity of eighty miles an hour, at the rate of a hurricane, would only give a total pressure of one hundred and twenty-eight tons distributed over the whole side of these tubes.

During the period of construction, the Menai Straits were thronged by visitors of every class, including some of the most illustrious in rank, literature, and science; and the Britannia Bridge, as a stupendous exhibition of engineering skill, will ever continue to attract the curious tourist and intelligent mechanician.

On March 5, 1850, one line of roadway being complete, the first railway train passed through; and on March 18, the bridge was opened for traffic.

Another Tubular Bridge, of rival magnitude to the one across the Menai Straits, was constructed in 1857 by Mr. Brunel, across the Tamar at Saltash, for the South Devon and Cornwall Railway, and named the "Royal Albert." In the plan of making the foundation, as well as in the structure of the bridge itself, Mr. Brunel adopted a course altogether original. Instead of attempting to construct a coffer-dam by piles, which would have been almost impracticable at such a depth, and very costly, he caused a large iron tube to be put together, thirty-six feet in diameter, and ninety-six feet long, to reach to the bed of the river. This monster tube was lowered perpendicularly in the middle of the river; and the water being pumped out of it, the men could work at the bottom in safety. In this manner, after much labour, the rock was prepared to receive the blocks of granite, which were laid one on the other, till they rose above the surface of the water. On that granite pedestal a cast-iron pier was raised to a height of 100 feet, the level of the roadway of the rails.

The cast-iron pier consists of four octagonal columns, 10 feet in diameter. Each of these columns weighs 150 tons; and when the full weight of the bridge rests on the foundation of the central pier, the pressure will be equal to 8 tons on the square foot, or double the pressure of the Victoria Tower on its base.

The briefest general way of describing it is to say that it consists of nineteen spans or arches, seventeen of which are wider than the widest arches of Westminster Bridge; and two, resting on a single cast-iron pier of four columns in the centre of the river, span the whole stream at one gigantic leap of 910 feet, or a longer distance than the breadth of the Thames at Westminster. The total length of the structure from end to end is 2,240 feet,—very nearly half a mile, and 300 feet longer than the entire stretch of the Britannia Bridge. The greatest width is only 30 feet at basement; its greatest height from foundation to summit no less than 260 feet, or 50 feet higher than the summit of the Monument. The Britannia Bridge, both in size, purpose, and engineering importance, seems to offer the best comparison with that of Saltash, but the similarity between the structures is far from being as great as might be at first supposed. The Britannia tube is smaller, and cost nearly four times the price of the Saltash Viaduct, though the engineers had natural facilities which Mr. Brunel, for his Cornish bridge, certainly had not.

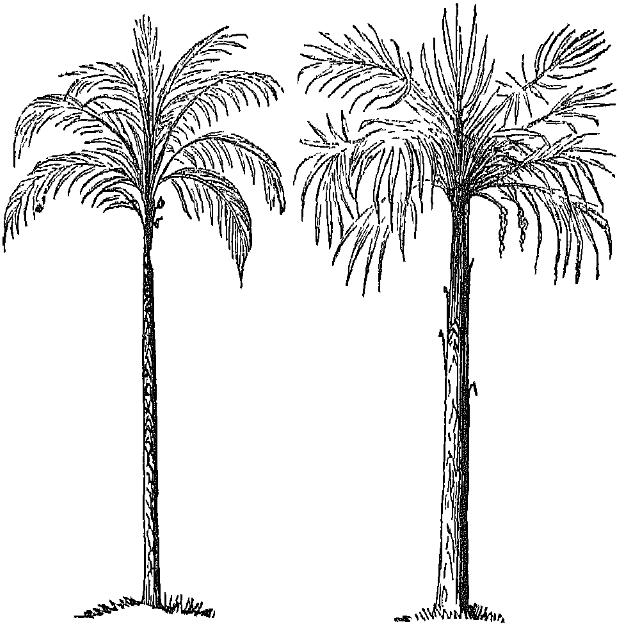
The form of the tubes is an oval, 17 feet in its longest diameter, and 12 feet in its shortest. They are bent into an elliptical curve, with a rise in the middle of twenty-eight feet. With the roadway and suspension chains attached, each tube weighs 1,100 tons. The total weight of wrought iron in the bridge is 2,650 tons; of cast iron, 1,200; of masonry and brickwork there will be about 17,000 cubic yards; and of timber, about 14,000 cubic feet.

THE PALM.

Thus seems the Palm, with stately honours crowned
By Phœbus' altars; thus o'erlooks the ground;
The pride of Delos.

THE Palm is the symbol of immortality, and is crowned with innumerable honours by the events of sacred and secular history. It is only found in climates where a tropical heat prevails, and the occurrence of remains of Palms in the coal strata and other geological formations, is held as a proof of a former high temperature in the climate of this country. Though found in reduced dimensions in Spain, the neighbourhood of Genoa, around Naples, and Sicily; the palms strictly belong to intertropical latitudes, where a high temperature and an intense blaze of sunlight prevails. The date-palm, with its cylindrical columnar stem, and crown of leaves, is a singularly graceful object in the deserts of the old world.

> Those groups of lovely date trees, bending
> Languidly their leaf-crown'd heads,
> Like youthful maids, when sleep descending
> Warns them to their silken beds.



PALM TREES.

But in equinoctial America the palm tribes appear in their greatest magnificence, fascinating the eye of the traveller, and startling him with their majestic proportions and slim, arrowy outlines. On the granite rock at the cataracts of Atures and Marpures on the Orinoco, the light green of the feathery leaves strikingly contrasts with the rich masses of darker vegetation, and adds a peculiar grace and charm to the scenery.

On the plains, which are subject to flood, the European is sometimes startled by seeing the tops of these trees lighted with fires. They are kindled by the Guanachas, a people who have remained for ages in these marshy districts, secured from the floods by residence amongst the tops of the palms, where with mats coated with clay, they construct hearths for the fires which are essential to their comfort. In other districts, says Desfontaines, the palm groves, being impervious to the rays of the sun, afford a hospitable shade, both to man and other animals, in a region which would otherwise be intolerable from the heat. Under this natural shelter, the orange, the lemon, the pomegranate, the olive, the almond, and the vine grow in wild luxuriance, producing, notwithstanding they are so shaded, the most delicious fruit. And here, while the ears are fed with the endless variety of flowers which deck these sylvan scenes, the ears are at the same time ravished with the melodious notes of numerous birds which are attracted to these groves by the shade, and the cool springs, and the food which they there find. The date, the cocoa-nut and the sago palms, are of vast importance to mankind, for the nourishing food which they supply, and their extraordinary fecundity, which led to the assertion of Linnæus, that the region of palms was the first country of the human race and that man is essentially palmivorous. The cocoa-nut palm produces annually, during the greater part of a century, one hundred of its large nuts, but the Seje palm of the Orinoco yields eight thousand fruits at a crop. A single spatha of the date palm, the broad sheathing leaf of which incloses the flowers, contains twelve thousand, while each spatha of another species, the *Alfonsa Amygdalina*, has two hundred and seven thousand flowers, and the individual plant six hundred thousand. The produce of the plaintain palm is still more enormous; a plant which requires but little cultivation; and is to immense numbers of the human race, what rice is to the Hindus, and wheat to the European. According to a calculation of Humboldt, upon the same space of ground, the weight of the yield in the case of bananas will be forty-four times that of potatos, and one hundred and thirty-three times that of wheat.

The ancients had a religious veneration for the palm, believing it to be immortal. It was said by them that a superb palm sprang suddenly out of the earth at Delos, to serve as a support for Latona, when she brought forth Apollo. Near the altar of this god at Delos, a palm-tree was to be seen, which they pretended was this wonderful tree. Homer speaks of it in the Odyssey; Cicero and Pliny also mention it, and say it was still shown in their time.

The Mussulmen say, that Mahomet multiplied dates to please a young girl. At Tonquin every year, they gather the fruit of the areca palm, and poisoning some of the nuts cause them to be eaten by a child, and from a horrible superstition, believe that the year will prove fortunate by the sacrifice of this innocent victim In ornamental architecture branches of palm are commonly imitated, and considered as the attributes of victory and martyrdom; it is also the emblem of conjugal affection. The unfortunate Mary, Queen of Scots, during her imprisonment, took for her device, a palm branch bending under its weight, and seeming to raise itself up, with the motto—"*Ponderibus, virtus innata resistil.*" * The palms in the palm-house at Kew, are remarkable instance of what may be achieved by horticultural skill, in setting aside the influences of an uncongenial climate, and enabling vegetation to maintain its vigour in circumstances adverse to its nature and habit.

WONDERFUL IMAGES.

In a preceding part of this work we gave a short account of Nineveh and some of the wonders recently found there, by Layard and others. Mention was then made of the finding, and the removal of the gigantic winged bull. We now give pictorial representations of two of those remarkable figures with a few additional observations. Since the discovery of Layard, great interest has been felt throughout Europe in Nineveh, its history, and the wonderful remains of a perished civilization which still exist there. Well might the *North British Review* state, "To the Scripture Student, who looks back with an eager interest to the epochs of his faith, obscured by the mists of ruthless legends, and the exaggerators of profane history, and who has studied these events but in the flickering light of prophetic inspiration, the contemplation of Nineveh in its ruins, must be a source of inexhaustible delight. In its utter destruction, rendered visible only in its fragments and in its dust, he recognises the inspiration of the prophet that pronounced its doom, and in the crumbling remains which have been preserved inviolate, till the world was wise to appreciate them, he sees a step in the great tide of advancing knowledge, which is to disclose to our race the hitherto invisible glories of infinite space, and the apparently inaccessible mysteries of primeval time.

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* True virtue enables us to sustain affliction.

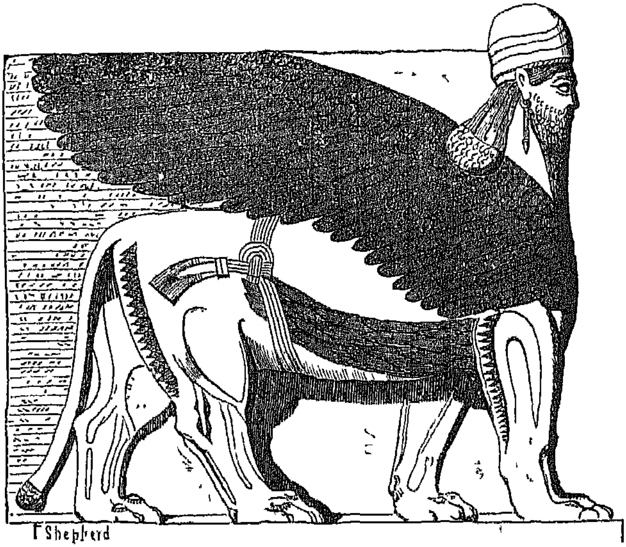
After so much has been said and written about the extraordinary statuary, found in this exhumed city, it is difficult in a short space to give the reader a definite idea of the character and condition of the place."

One of the most interesting portions of Mr. Layard's work is a recapitulation at the close of the thirteenth chapter, in which he endeavours to conduct the reader through the ruins of the principal edifice, and to convey to him some idea of the excavated halls and chambers as they appeared when fully explored: in short, a bird's-eye view of the entire edifice, which we find thus condensed in the *North British Review:*

"As we approach the mound, not a trace of ruins is to be seen; a broad and parched platform alone meets the eye. By a flight of rudely cut steps, we descend about twenty feet into the principal trench, and suddenly find ourselves between a pair of colossal lions, winged and human-headed, and forming a portal. Leaving behind us a small chamber in which the sculptures are rudely designed and executed, we pass from between the lions into the principal hall. On both sides of us are sculptured gigantic winged figures, eagle-headed and human-headed, with mysterious symbols in their hands. To the left is another portal formed by winged lions. One of them has fallen across the entrance, and there is just room to creep beneath it. Beyond this portal are a winged figure and two slabs, with almost effaced bas-reliefs. Further on there are no traces of a wall. The opposite side of the hall has also disappeared, and we only see a high wall of earth, which we discover to be a solid structure built of bricks of unbaked clay, scarcely to be distinguished from the soil. Slabs of alabaster fallen from their original position, have been raised, and we tread in the midst of a maze of small bas-reliefs representing chariots, horsemen, battles, and sieges.

"Having walked about one hundred feet among these monuments, we reach another doorway, formed by gigantic winged bulls in yellow limestone. One is entire; the great human head of the other is at our feet, and its body broken in pieces. Without entering the building to which this portal leads, we see, as we pass on, another winged figure, apparently presenting a flower to the winged bull; and adjoining are eight bas-reliefs portraying the king hunting and triumphing over the lion and wild bull; and also, the siege of the castle, with the battering-ram.

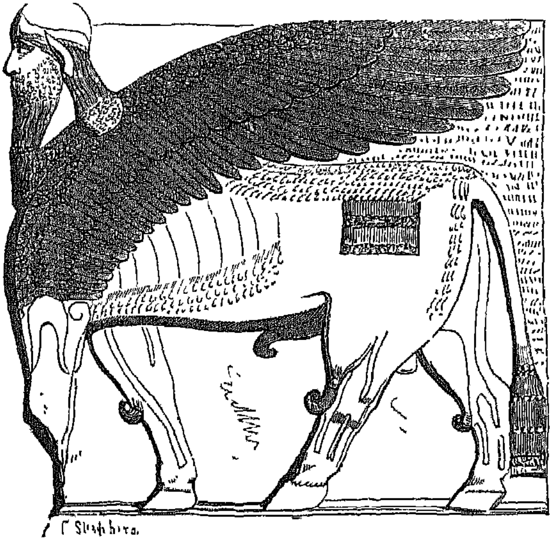
"We are now at the end of the hall, and before us is an elaborate sculpture,—two kings standing beneath the emblems of the Supreme Deity, and attended by winged figures. Between them is the sacred tree. In front of this bas-relief is the great stone platform on which the Assyrian throne may have stood. Issuing through a fourth outlet from the hall, between another pair of lions, we are stopped by a deep ravine, to the south of which towers above us the lofty pyramid. On walls near this ravine are seen various figures of tribute-bearing captives and monkeys; and lying on its very edge are two enormous bulls, and two winged figures above fourteen feet high.



WINGED LION.

"Returning to the yellow bulls, we pass between them into a large chamber, surrounded by eagle-headed figures, having at one end a doorway guarded by two priests, and in the centre another portal guarded by winged bulls. Whichever way we turn, we are in the midst of a nest of rooms, and should soon lose ourselves. As the rubbish has been placed in the centre of the chambers, the excavations consist of a number of narrow passages, pannelled on one side with slabs of alabaster, and shut in on the other by a high wall of earth, in which a broken vase or a painted brick may be seen. Other entrances, formed by winged lions, lead us into new chambers, containing fresh objects which at once surprise and interest us.

"Emerging from the buried palace by a trench opposite to that by which we entered, we are again upon the level plat-



WINGED BULL.

form. We are half inclined to believe that we have dreamed a dream, or have been listening to some tale of Eastern romance. 'Some,' says our author, 'who may hereafter tread on the spot when the grass again grows over the ruins of the Assyrian palaces, may indeed suspect that I have been relating a vision.'"

THE CEDARS OF LEBANON.

> Thus yields the cedar to the axe's edge,
> Whose arms gave shelter to the princely eagle;
> Under whose shade the rampant lion slept,
> Whose top-branch overpeered Jove's spreading tree,
> And kept low shrubs from winter's powerful wind.

In the world of flowers, the Rose justly claims the title of queen—as in the world of trees, the Cedar is the rightful king. Neither historically, nor naturally, is the Oak the king of trees; he is the first of all the trees of Britain: but in the trees of the world, the Cedar is the king. Hoary with antiquity! venerable from Biblical and Historical reminiscences, majestic, and ever verdant; the cedars of Lebanon are without parallel in the vegetation of the world. There is no case of insulated growth more striking than this of the Cedar of Lebanon—which, according to Dr. Milner, "has never been found indigenous in any other locality."

From the earliest times, the Cedars of Lebanon have been celebrated; their timber was largely used in some of the most famous structures of the ancients, and was highly prized on account of its durability; for though not equal to the oak in absolute wear; it is so bitter that no insect will touch it. When Solomon built his temple, he sent to Hiram, the lord-paramount of Lebanon, to procure the necessary quantity of Cedar-wood for the structure; and the thirty-thousand axes of the king of Israel must have deprived the heights of some of their noblest trees. Very few of the ancient stock now exist: whether owing to similar ravages, or to some change in the climate, it is impossible to determine. When Ballonius visited them in 1550; there were twenty-eight of the old race remaining. In 1575 Ranwolf found twenty-four; in 1680 Dandini found twenty-three; in 1738 Pococke counted fifteen; in 1811 Burckhardt could only number eleven; Dr. Richardson, in 1828, and Lamartine, in 1832, speak only of seven. The age of these patriarchal trees has been variously estimated. The inhabitants firmly believe them to be the remains of the identical forest which flourished in the time of Solomon. Lamartine supposes it a fair presumption, from their rise and appearance, that they go back to biblical times. It is certain that they were regarded as very ancient several centuries ago; nor is it unlikely that they are the surviving relics of a second generation, since the time of the Jewish kings.*

* Milner's Gallery of Nature.

The Cedar full grown, with its upward inclining branches, is one of the most majestic and beautiful of the productions of the vegetable kingdom. It will reach the height of a hundred and thirty-five feet, and hence became the subject of the sublime comparison in Holy Writ, "I have seen the ungodly lift up his head to the cedars of Mount Lebanon, yet he passed away, and lo! he was not: I sought him, but he could not be found." They are of very quick growth, as appears from the increase of those fine specimens planted in the physic garden, at Chelsea, in the year 1683, and then not above three feet high; in 1762 they measured twelve feet in the girth, at two feet above ground. This quick growth accounts somewhat for the perishable nature of the timber, though instances are on record which show that it occasionally wears well, as that of the Temple of Apollo, in Utica, where was found a trunk of Cedar two thousand years old.

The ancients believed the cedar to be proof against corruption, for which reason they deposited their most precious manuscripts in coffers made of its wood; thence it became proverbial to say in praise of a literary work, "It deserves a cedar casket." The ornaments in Soloman's temple were of cedar sent to him by king Hiram, as was also the greater part of the timber work in the temple of Diana, at Ephesus. The wood is of so dry a nature, that it will not endure to be fastened with iron nails, from which it usually shrinks, so that they commonly fasten it with pins of the same wood.

The branches during growth invariably bend upwards, and the Arabs regard this inclination as a sign of intelligence, answering to instinct in animals, and reason in man; and it is asserted that this upward turning of the branch is always greater previous to the descent of snow, as if the tree anticipated and prepared to receive the coming burden.

> It was a cedar tree,
> That woke him from the deadly drowsiness;
> The broad round spreading branches when they felt
> The snow, rose upward in a point to heaven,
> And, standing in their strength erect,
> Defied the baffled storm.

Various magnificent specimens of the cedar of Lebanon have been reared in England, but it has never been found growing wild apart from the Syrian mountains.

TRUNKS OF CEDAR TREES.

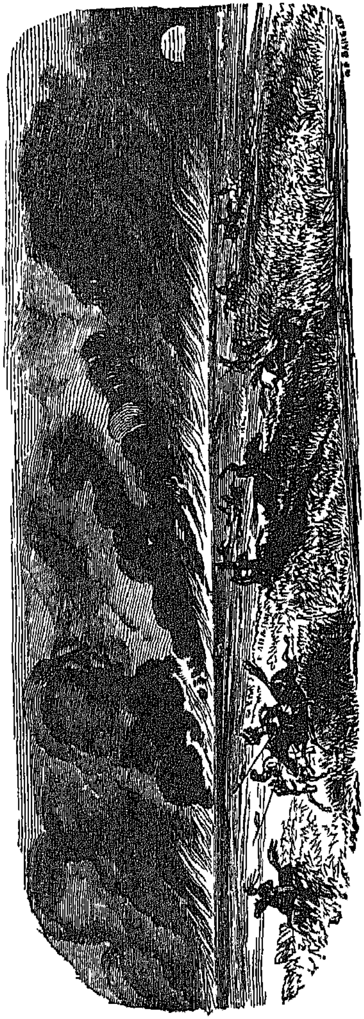
THE PRAIRIES.

THE scenery of America is of that vast and extensive character which impresses the mind in most instances with a sense of wonder rather than of beauty. The hedge-rows of old England, the grassy meadows, the homely sheep; the velvet-dimpled orchards and mossy-trunked clumps of venerable trees; the forest rivulets and the wood-side flowers are such prominent features of the scenery of this country that there is little in Britain (excepting in the civilization and enterprise of its people) to excite wonder. We have beauty, freshness, homely thoughts, and hospitality; but we have little that is grand, imposing, or wonderful. On the American Continent, on the contrary, the scenery is of that breadth and majesty which form the first elements of grandeur, and the wonderful is plentifully sprinkled through its plains and forests and mountains. The Mississippi, rolling its broad flood through three thousand two hundred miles of country, its white wavelets laving the fertile plains and mountain sides through scenery the most extraordinary in the world. The falls of Niagara, the sublimest object on earth, with its large waters plunging down a depth of one hundred and sixty feet; the rocky mountains, with their grand sterility and snow-capped solitudes; and the savanhas and prairie lands, with their wide grassy plains, and innumerable herds of cattle, are but a few of the striking features of that broad territory of wonder.

The Prairies are extensive plains, which in some parts of North America stretch continuously over many hundreds of miles of country. They are, in fact, great natural meadows, covered with luxuriant grasses and multitudinous flowers, variegated occasionally by clumps of stunted brushwood and low undulations on hills, which rise and fall over the entire surface like billows. These undulations are sometimes so regular, and so completely fill up the landscape with their dimple slopes and softened summits, that the eye is so deceived by their continuity and softly swelling outlines, that they seem perpetually in motion, rolling one upon the other, like grassy waves of verdure and flowers. Except these, however, there are no hills sufficiently elevated to break the surface of the plain, and the utter absence of large trees renders the prairie a strange wild scene, silent and mournful, and reaching out to the horizon in all directions, with its undulating surface of herbage and flowers. Occasionally the solitude is enlivened by the presence of wild deer and by innumerable birds; and at times the herds of bisons associate in thousands and crop the herbage which they find provided for them in these natural and almost boundless meadows. The surface of the prairies is sometimes blackened by their numbers. "It is no exaggeration," says Mr. James, "to assert that in one place, on the banks of the Platte, at least ten thousand burst on our sight in an instant. In the morning we again sought the living picture; but upon all the plain, which last evening was so teeming with polar animals, not one remained."

"The prairies are most numerous in the central parts of North America, reaching from the Mexican Gulf to the inhospitable shores of Hudson's Bay and the Arctic Sea. This vast region, almost as large as the whole of Europe, is the site of two of the greatest river-systems in the world, that of the Mississippi and its tributaries, and that of the St. Lawrence, with the chain of the Canadian Lakes. In this great district a person may have been born, may have lived to old age, and travelled much, without once seeing an elevation worthy of the name of a mountain. The prairies form the chief portion of the scenery of this extensive district, and present many varieties of character and aspect. The heathy prairies are covered with bushes of hazel and furze, swale, sassafras shrubs, with grape vines, and an infinite variety of flowers in the summer season. The wet prairies occur by the side of the great watercourses, and are scenes of exhaustless fertility, almost dead levels; though some are found apart from rivers, and form unhealthy swamps, such as the dismal swamp of Virginia, and the morasses of Florida. The dry prairies constitute the most extensive class, and are for the most part destitute of springs, and of all vegetation but weeds, flowering plants, and grasses. Describing his approach to one of these plains, Washington Irving says, "Here one of the characteristic scenes of the 'far west' broke upon us. An immense extent of grassy, undulating, or, as it is termed, 'rolling country,' with here and there a clump of trees dimly seen in the distance like a ship at sea, the landscape deriving sublimity from its vastness and simplicity. To the southwest, on the summit of a hill, was a singular crest of broken rocks, resembling a ruined fortress. It reminded me of the ruin of some Moorish castle, crowning a height in the midst of a lovely Spanish landscape. The weather was verging into that serene but somewhat arid season, called the Indian summer. There was a smoky haze in the atmosphere that tempered the brightness of the sunshine into a golden tint, softening the features of the landscape, and giving a vagueness to the outline of distant objects. This haziness was daily increasing, and was attributed to the burning of distant prairies by the Indian hunting parties."

This burning of the prairies is repeated every summer. When the ground is dry and the herbage parched and withering, the Indians make up hunting bands, and setting fire to the low stubble, devote all their energies to secure the game which the fire drives from the covert. Deer, wapitis, bisons, hares, rabbits, and birds of all kinds fly together from the danger, and the plain is covered by the affrighted creatures seeking shelter and safety. Now the huntsman plies the bow or rifle, and bags the game in immense numbers; while the flames, fanned by the wind and fed by the crackling branches of the shrubs, and the withered stubble of the weeds and grasses, soon spread on all sides and enveloped the country in one wide sheet of burning and advancing desolation. At night the scene is terrific. The horizon is lighted all round by a fringe of orange flame, and the low roar of the flames as the wind sweeps them rapidly along over the dried up landscape, the cries of the creatures, hastening on weakened feet or wing, panting for water, and half suffocated by the hot wind which advances before the flame, defies description and fills the mind with terror. Viewed from an eminence, and out of reach of danger, it is awfully grand and imposing, but seen from the midst of the plain with the wind blowing towards the spectator, it is like the unfolding of a scarlet scroll on which his death is written. If overtaken by these fires when travelling over the plains, escape is almost impossible, and the rapidity with which the fires spread, and the suffocating heat and smoke together, make destruction almost certain to any living creature which the fire meets. A party who were overtaken in this way, while leisurely riding over one of the prairies beside the Missouri, were driven to a most revolting expedient in order to save their lives. They saw the air thickening, and presently a burnished red line appeared upon the horizon. They knew in a moment what it foreboded, and calculated their chances of escape. Putting spurs to their horses, they flew before it; but the fire advanced more rapidly than they, and its seething sound soon reached them and their terrified steeds. The thin red line had grown into a fringe of flames, and in half an hour it would reach the spot where they were, and the horses were too exhausted to carry them further. Reaching a somewhat barren and elevated spot, they quickly shot their horses, and removing the entrails from the warm carcases of



A PRAIRIE ON FIRE.

the bleeding beasts, committed themselves to the Almighty, and crept into the hollow bodies of the lifeless brutes. Scarcely had they taken shelter within the warm hides, in a manner so revolting to their feelings, than the air became insupportably hot, and the full surge of the blood-red flames played over and around them. The brushwood crackled and spurted in the flames; the huge volume of advancing fire roared like a roaring sea, and while the travellers heard the scorching of the hides of their steeds, they held their breath almost to suffocation, there was a few moments of intense agony, during which the heat penetrated through the carcases which sheltered them, and with no escape, while it was impossible to breathe without inhaling the contending flames themselves, death seemed inevitable. But when danger had reached its height, and the mind had become delirious from the heating of the blood and brain, the fire had entirely passed, and a fresh cold breeze, and then a strong current of bracing wind swept over them, and they crept out panting, and returned thanks for their deliverance. The bodies of their martyred steeds were almost wholly consumed, and the black charred, unctuous, and still steaming and frizzling remains showed how narrow and frail a partition had stood between them and the most hideous death.

Though the burning of the prairie is thus fraught with danger, it is on the other hand most beneficial to the hunters, who take immense quantities of game, while the ashes left on the plain form a rich manure for the next crop of vegetation, which springs from the black surface as soon as the rains fall, and where desolation had brooded in darkness and silence, fresh troops of flowers spring forth, and the desert is again enlivened with the humming of the bee, and the songs of the rejoicing birds.

DIAMONDS.

THE KOH-I-NOOR, OR MOUNTAIN OF LIGHT.

NOTHING in the range of natural curiosity approaches so near to the wonderful as the relation subsisting between a diamond and a coal. Chemistry startles us at every point of our inquiry into the inner constitution of bodies, and we learn with surprise that the atmosphere and nitric acid are composed of the same materials, that the most virulent vegetable poisons are composed of the same elements as our bread, that linen rags may easily be converted into sugar, and that between a black coal and a brilliant diamond, the first affording light by combustion only, the second giving light by a phosphorescent scintillation of its own; the first, smelling of tar, and emitting immense volumes of smoke when ignited—the emblem of all that is black, unclean, and ungraceful; the second, purer than snow to the senses, the emblem of all that is dazzling, translucent, and elegant; that between this coal and this diamond, there is no essential difference, except in those outward characters which are admitted as the least important in reference to our judgments of bodies! It is, in fact, something wonderful, that coal and diamond should have so near a relationship.

The result of this relationship is to be found in the fact that the two bodies in question are composed of the same element. Carbon, one of the primary elements in nature, forms the bulk of all woods, and enters largely into the structure of plants and animals. Charcoal, which may be obtained in abundance from wood, spirits of wine, rum, or brandy, is nothing else than carbon in a somewhat impure form, and the diamond is also carbon in the purest form. In chemistry, the appearance of a substance is no indication of its composition, and in accepting the fact that the diamond and charcoal are made up of similar atoms, while in charcoal those atoms may be *differently arranged* to what they are in the diamond, and that consequently one substance is beautifully bright and transparent, whereas the other is black, dull, and dirty.

The diamond, called *adamans* (from whence adamant) by the Greeks, *almas* by the Persians, and *heera* by the inhabitants of India, has been known and valued from a period of great antiquity. Pliny, a Roman writer, strongly sets forth that naturally the diamond cannot be broken into fragments; but this may be done after soaking it in the blood of a *he-goat!* and that the fragments so procured are very valuable for engraving on other gems." He also held that "the diamond destroys the effects of poisons, and cures insanity;" assertions which we now regard as interesting relics of an age of superstition.

We learn from Pliny, however, a fact of importance, namely, that diamonds had not long before his time been brought from India, and from that period (A.D. 79) to the year 1728, India furnished the world with the entire supply of these gems. The mode of polishing them was discovered in 1746, and from that time to the present, the demand for these beautiful productions has been steadily increasing. Its value, as an article of utility, is still however as small as before, but owing to its extreme beauty, it acquires a nominal worth, and is sold at exorbitant rates.

The Pitt, or crown diamond of France, if valued according to the ordinary rule, is worth £141,058. It was found at Pasteal, in Golconda, and was purchased by Mr. Pitt, the Governor of Madras, for £20,000. In the year 1717, he sold it to the Regent of France for £125,000, as a crown jewel; but Napoleon had it set in the hilt of a sword of state. The Emperor of Austria possesses a very large lemon-coloured diamond of very great value, which was purchased at a stall in the market-place of Florence for a few pence, as it was thought to be a piece of rock crystal.

The Emperor of Russia has a diamond, the history of which is very curious. It once formed the eye of an Indian idol, and a French soldier having taken a fancy to it, he became priest to the deity, in which capacity he managed to extract the diamond eye and replace it with a glass one. Escaping with his treasure, he sold it at what *he* thought a good price, but which was in reality a very low one. The jewel, after passing through a number of hands, was purchased by the Empress Catherine of Russia, who gave a sum of £90,000 for it, besides an annuity of £4,000 as a further remuneration! A diamond of very large size is in the possession of the Royal Family of Portugal, but doubts are entertained by some persons whether it be a genuine diamond or a white topaz; if genuine, its estimated value is nearly two millions of pounds sterling.

Long before the diamond was known to be identical in composition with charcoal, Sir Isaac Newton suggested that it might contain combustible matter, from observing that it refracted or bent from a straight course the rays of light. He termed it an *unctuous substance coagulated.* In the year 1763, our celebrated countryman, Boyle, proved that the diamond might be converted into vapour by a heat not exceeding that required to melt copper. Cosmo III., duke of Tuscany, succeeded in burning diamonds by concentrating on them the sun's rays by a burning glass; and the French chemist, Lavoisier, first proved that they contained carbon.*

The Koh-i-noor, or Mountain of Light, is deservedly one of the most famous diamonds in the world, and perhaps the most valuable. There is certainly no existing gem which has been so identified with the sudden changes of fortune of dynasties and individuals, and in connection with the history of which so much blood and treasure has been wasted.

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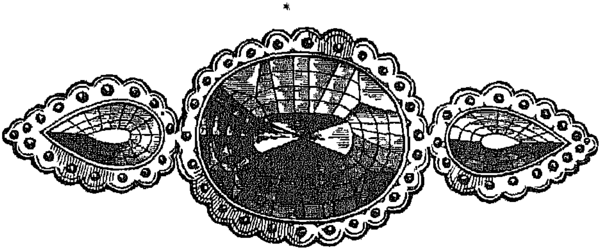
* Schoffern's "Chemistry no Mystery."

It was in the year 1550 that the Koh-i-noor was discovered in the celebrated mines of Golconda. When the Mogul Princes extended their pretentions to the sovereignty of the Deccan, Kootub Shah, then king of Golconda, was brought into collision with Shah Jehaun, the reigning Emperor, and father of the great Aurungzebe. Kootub Shah's prime minister at this period was the famous Meer Jumla, a statesman who to political abilities of unusual excellence added a singular knowledge of precious stones. He had, in fact, been at one time a diamond merchant, and was therefore peculiarly competent to appreciate the treasures of Golconda. It happened too that Shah Jehaun himself was a connoisseur of scarcely less skill, insomuch that when at a later period he had been dethroned and imprisoned by his father, and a doubt had been created respecting the value of a certain ruby in the Imperial treasury, the gem was actually transmitted to the deposed Prince for his inspection and decision. Two such characters were well fitted for the transaction which ensued. Shah Jehaun took up the cause of Meer Jumla against his sovereign, and the Koh-i-noor passed from Golconda to Delhi.

Resting among the imperial treasures of Delhi, the Koh-i-noor was seen by the French traveller Taverner, on the 2nd of November, 1665, who, by the extraordinary indulgence of Aurungzebe, was permitted to handle, examine, and weigh it, being the first, and till lately the last, European who had ever enjoyed such a privilege. In 1739, the empire of Delhi received its fatal blow from the invasion of the Persian warrior Nadir Shah, who carried back to Khorassan ninety millions sterling worth of treasures, and amongst them the famous Koh-i-noor. But Nadir Shah, the conqueror, was soon after assassinated by his subjects, and Ahmed Shah, who carried off his master's jewels while retreating with his band of Affghans through the hosts of the Persian army, soon consolidated a new state, under the title of the Dooranee Empire, and with the sovereignty which seemed to follow the Koh-i-noor, he soon made as many conquests as his predecessor, and acquired sufficient influence to enthrone the last of the Moguls.

At the commencement of the present century, the treasurer of Ahmed Shah were vested in the person of Zemaun Shah; and in the year 1800, this Zemaun Shah was made prisoner by his brother Shah Shuja, the identical puppet in 1840 of our Cabul expedition, thus bringing down the history of the diamond to modern scenes and characters. Shah Shuja ascended the throne of his imprisoned brother, but the treasury was wanting in its most precious ornament, till at length, ingeniously secreted in the walls of Zemaun Shah's prison, was found the Koh-i-noor.

Eight years afterwards, Mr. Elphinstone, accredited by Lord Minto to the Affghan Prince, betook himself to the town of Peshawur, where at his state reception, the Koh-i-noor again flashed, after an interval of nearly two hundred years, upon the eyes of an European. Shah Shuja, afterwards the client and pensioner of the East India Company, was dressed on this occasion in a green velvet tunic, seamed with gold and precious stones: on his breast was a cuirass of diamonds, shaped like a *fleur-de-lis*, and in a bracelet on his right arm blazed the precious jewel of Golconda.



THE KOH-I-NOOR.

Scarcely had the embassy re-crossed the Indus, when Shah Shuja was expelled from Cabul, though he contrived to carry with him the precious Mountain of Light. Taking shelter under Runjeet Singh, the latter soon began to speculate upon the treasure possessed by the fugitive, and determined to acquire it. At last he made a formal demand for the diamond. The Dooranee Prince hesitated, prevaricated, temporized, and employed all the artifices of Oriental diplomacy, but in vain. Runjeet redoubled the stringency of his measures, and at length, on the 1st of June, 1813, the two Princes met in a room appointed for the purpose, and took their seats on the ground. A solemn silence then ensued, which continued unbroken for an hour. At length, Runjeet's impatience overcame the suggestions of Asiatic decorum, and he whispered to an attendant to quicken the memory of the Shah. The exiled Prince spoke not a word in reply, but gave a signal with his eyes to a eunuch in attendance, who, retiring for a moment, returned with a small roll, which he set down upon the carpet midway between the two chiefs. Again a pause followed, when, at a sign from Runjeet, the roll was unfolded, and there, in its matchless and unspeakable brilliancy, glittered the Koh-i-noor.

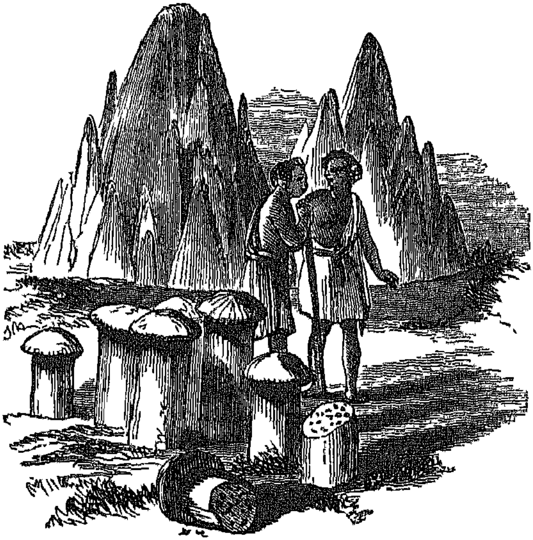
Runjeet Singh had to encounter British arms at Lahore, at his defeat the Koh-i-noor passed into the hands of the British, and became the chief of the jewels of the crown. In 1851, the Koh i-noor achieved a higher though a less costly popularity than that which it had previously enjoyed, by its exhibition in the central avenue of the Crystal Palace in Hyde Park. There it attracted the eyes of thousands; to say millions, would scarcely be an exaggeration, and in this phase of its history it became a more powerful evidence in behalf of the arts of peace and progressive civilization, than it had formerly been a subject of conflict and an incentive to the worst of passions, and the most hideous of desires. Visited by thousands daily, there was neither contention nor bloodshed respecting its appropriation, and its free presentation to the eyes of all people contrasted strangely with its ancient hidden, and secluded existence, when it was seen by but a few, and each of those few were immediately concerned, no matter if by the foulest means, to become its possessors. Excepting the somewhat doubtful claims of the Brazilian stone among the Crown jewels of Portugal, the Koh-i-noor is the largest known diamond in the world. When first given to Shah Jehaun it was still uncut, weighing, it is said, in that rough state, nearly eight hundred carats, which were reduced by the unskilfulness of the artist to two hundred and seventy-nine, its present weight. It was cut by Hortensio Borgis, a Venetian, who, instead of receiving a remuneration for his labour, was fined ten thousand rupees for his wastefulness by the enraged Mogul. In form it is "rose-cut'—that is to say, it is cut to a point in a series of small faces, or "facets," without any tabular surface. A good general idea may be formed of its shape and size by conceiving it as the pointed half of a small hen's egg, though it is said not to have risen more than half an inch from the gold setting, in which it was worn by Runjeet Its value is scarcely computable, though two millions sterling has been mentioned as a justifiable price, if calculated by the scale employed in the trade. The Pitt diamond brought over from Madras by the grandfather of Lord Chatham, and sold to the Regent Orleans in 1717 for 125,000*l*., weighs scarcely one hundred and thirty carats; nor does the great diamond which supports the Eagle on the summit of the Russian sceptre weigh as much as two hundred. Such is the extraordinary jewel which in virtue of conquest and sovereignty has passed into the possession of England.

THE PONT CYSYLLTAN

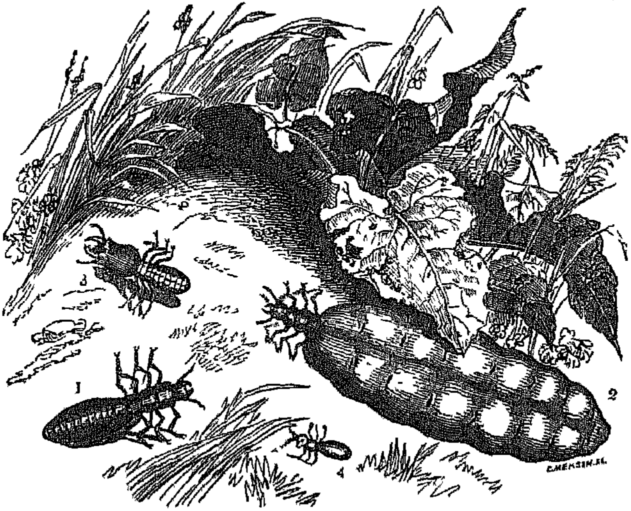
Is an aqueduct constructed for the purpose of conveying the Ellesmere Canal over the river and vale of the Dee. It is a wonderful effort of ingenious contrivance, and affords a convincing proof of the incalculable capability of human energy when directed by science. It was commenced in 1795, from designs by Mr. Telford, and completed in ten years. Its direction is from north to south, crossing the Dee at right angles; and it forms, in connexion with the exquisite scenery surrounding it, a noble and magnificent picture. To view it to the best advantage, the visitor must descend on one side of it into the valley beneath. Though the aqueducts of the Romans were superior in length, they were inferior in other respects to this modern structure, which in its turn is now surpassed in massive grandeur and importance by the Dee Railway Viaduct.

The Cysylltan aqueduct, in length one thousand and seven feet, consists of nineteen arches, each forty-five feet in span, with the addition of ten feet six inches of iron-work in continuation at each end. The supporting piers are of stone, of a pyramidal shape, measuring at the base twenty-one feet by fourteen feet wide, but diminishing upwards to twelve feet by seven at the top; and their height about one hundred and sixteen feet. Over this immense arcade is extended a trough, or large open caisson, made of cast-iron, eleven feet ten inches broad, by which the water of the canal is conveyed over the river, one thousand and nine feet, to the opposite level. Two iron plates are screwed together from centre to centre of each arch; and along one side of the canal is a towing-path, four feet in breadth, with a handsome iron balustrade as a defence for man and horse. At the southern end is an embankment of earth, fifteen hundred feet in length, and seventy-five feet in height, nearest the abutment of the arches. The whole undertaking cost £47,000. Further on is the Chirk Aqueduct, which carries the Ellesmere Canal over the vale of the Chirk and the river Ceiriog. It is two hundred and thirty yards long, and consists of ten arches, the piers of which are sixty-five feet high. The canal on crossing this aqueduct immediately enters a tunnel two hundred and twenty yards long. Side by side with this aqueduct is the railway viaduct over the Ceiriog. It is a construction of a massive character and picturesque effect; consists of twelve arches, ten of which are of stone, each with a span of forty-five feet; and the extreme arch at either end is of timber, with a span of one hundred and twenty feet; the length of the viaduct is eight hundred and forty-six feet, and its height one hundred feet.

THE WHITE ANTS.



Accustomed as we are to the remarkable economy of many of our British gregarious insects, the white ants of America and Africa form a striking contrast in regard to their number, their depredations, and their social organization, to the limited development of these qualities and tendencies in the ant, the the bee, and the wasp. The white ants, or termites, belong to the order Neuroptera, of the class insects, and are characterised by naturalists as terrestrial insects, carnivorous or omnivorous, and living in societies like the bees, the wasps, and the ants of this country. Allied to the insects just mentioned, they nevertheless differ from them in many points of structure, the requisite illustration of which would be of too abstruse a nature for the object of the present work. Our object (at present) is to select whatever, in the economy of nature or the achievements of art, partakes of the wonderful; and therefore we pass over the details of scientific classification and make direct for whatever in the history of the *termites* may be deemed elements of the wonderful. Fortunately, there is no lack of wonder here, for the entire history and habits of these creatures is of the most extraordinary kind. In the first place, the members of the white ant communities are divided into four separate orders, namely, workers, soldiers, kings and queens. Smeathman who first furnished a complete account of these creatures, denominated the two latter classes the nobility, because they neither *labour nor fight*. The workers are the imperfect insects or larvæ; grubs, or maggots in fact, which have to go through another metamorphosis before they become perfect insects. The soldiers are the perfect insects, corresponding to the working classes of our ants and bees, and are destitute of sex; while the kings and queens



1 King. 2 Queen. 3 Soldier. 4 Labourer.

are the perfect males and females which propagate the race. It is worth mentioning here, that it has recently been discovered that the neuter, or working insects, in all bee and ant communities, are females, in whom the organs of generation are undeveloped, and that strictly they are not sexless but sterile. The workers abound in countless numbers, and by their united exertions the conical hills of earth are raised in which the community reside. The workers are about a quarter of an inch in length, and differ but slightly in shape and appearance from those more advanced in life. The soldiers are about half an inch in length, and in general bulk equal to about fifteen labourers. In the larva state the mouth was evidently formed for gnawing, or for holding bodies; but in the soldier condition they are fully armed and equipped for war, being shaped like two sharp awls, a little jagged, and destined exclusively for piercing and wounding. They are as hard as crab's claws and fixed in a strong horny head, which is larger than the rest of the body, so that in this stage of existence the white ants is prohibited by his own organization from becoming a member of a peace society. In fact, he finds himself helmeted and armed with these bodkins, and having a desire to be useful and to employ these instruments for the good of the community, he engages fiercely in war, as we shall see presently.

In appearance, however, the perfect insect is the most remarkable. Altered in size and figure, and furnished with well made wings, the kings and queens, or rather the titled aristocracy, (privileged even in these hat-shaped earth-holes to eat the bread of idleness), of these ant families grow to an enormous size, and soon weigh as much as thirty of the meagre labourers, while they measure not less than two inches and a half each. But like well fed paupers these royal dukes and dames are pronounced by sneering naturalists as helpless, dastardly, and indolent. Forthwith nature wages war against them, and the drivelling swarms of listless loungers are preyed upon by birds, by other species of ants, by carnivorous reptiles, and by men. Their numbers are great at first, but are rapidly reduced, and the few which escape this general vengeance of the enraged republicans without, find shelter from their enemies and survive to perpetuate the race. Not by chance, however, do these few fortunate ones escape; the truth is that, like the children of Israel, the working ants cry out for a king, and gathering from the melee a pair of these half extinguished grandees, elect them as king and queen of the community, leaving those not so elected to perish.

"The little industrious creatures," say Smeathman, "immediately enclose them in a small chamber of clay suitable to their size, into which at first they but leave one entrance, large enough for themselves and the soldiers to go in and out at, but much too little for either of the royal pair to use; and when necessity obliges them to make more entrances, such entrances are never larger: so that the voluntary subjects charge themselves with the task of providing for the offspring of their sovereigns, as well as of working and fighting for them, until they have raised a progeny capable of at least dividing the task with them." A right good loyal lesson for grumbling democrats in all time to come.

At this time another change comes over the fortune of the monarchs, and the queen is declared to be in a happy state of promise. The body of the queen is indeed, literally full of eggs, and in some cases the abdomen is increased to at least two thousand times that of the remainder of the body. When the eggs are perfectly formed, they begin to be protruded, and they come forth so quickly that about sixty are deposited every minute, which is equal to eighty-six thousand four hundred in a day, and thirty-one million, five hundred and thirty-six thousand in a year. The labours of the workers in attending the queen are at this time most trying, for as she cannot then move about, they are under the necessity of carrying off the eggs as they are laid, to the nurseries. If the cell of a queen be broken open during the process of laying, she is seen to be surrounded by myriads of labourers all engaged in carrying off the eggs. When these eggs are hatched, the young ones are provided with everything necessary until they grow to the state of workers, when they take their respective places, and drive round the never flagging wheel of white ant industry.

The nests of the termites are sometimes concealed in the earth, or in the interior of trees, and through those they bore galleries in such a manner, that, though the outer surface is left untouched, they fall to pieces on the slightest violence. Sometimes the nests are elevated several feet above the surface of the ground, and have a pyramidal roof. They make their way with the utmost ease into trunks and boxes, and destroying everything they contain, constructing their galleries, and sometimes taking up their abode in them. In consequence of this, Humboldt informs us, it is almost impossible to meet with papers or documents in any of the warmer parts of equinoctial America which extend further back than sixty years. Parish registers and city charters go the same way, and many a republican constitution has been eaten up in a night. Cloth, linen, and locks, are equally to their taste; and in one night they will destroy all the boots and shoes left in their way. Forbes, in his "Oriental Memoirs," tells us that, on surveying a room which had been locked up during an absence of a few weeks, he observed a number of ant-works advancing towards some prints and drawings in English frames, the glasses of which appeared unusually dull, and the frames covered with dust. "On attempting," he adds, "to wipe it off, I was astonished to find the glasses fixed to the wall not suspended in frames, as I had left them, but completely surrounded with incrustation, cemented by the white ants, who had actually eaten up the deal frames and backboards, and the greater part of the paper, and left the glasses upheld by the incrustation or covered way, which they had formed during their depredations. A microscope which Mr. Smeathman had left for a few months at Tobago, he found, on returning, completely eaten up, with the exception of the glass and metal. Their cells were built all round the pedestal and tube, and the glass and lacquer-work were spoilt by their gummy incrustations. Another party of these ants took a bacchanalian turn, and, pouncing on a cask of Madeira wine, devoured the staves, and let out the wine. When the termites appear, chests, drawers, wainscoting, rafter-joists, and everything of a vegetable origin, disappear; and, perhaps, on retiring to rest, you are astonished, the moment you prostrate yourself on the bed, to find that it crumbles into powder beneath you, and that, in fact, the whole substance has been eaten up, except the outsides of all the frames and trappings, which, till touched, look as sound as ever. If a stake in a hedge has not taken root and vegetated, it becomes their business to destroy it; if it has a sound bark, they will enter at the bottom, and eat out all but the bark, which will remain, and exhibit the appearance of a solid stick; but if they cannot trust the bark to remain whole while they devour the inner wood, they cover the whole stick with mortar, and it then looks as if it had been dipped in thick mud, and the mud left to dry on. To work then they go, and the mud-wall, or outside cast of the stick, is all they leave behind them. "These excavated trees," says Smeathman, "have deceived me two or three times in running; for in attempting to step two or three feet high, I might as well have attempted to step on a cloud; and have come down with such unexpected violence, that, beside shaking my teeth and bones almost to dislocation, I have been precipitated, headforemost, amongst the neighbouring bushes."

We hinted at the pugnacity of the soldiery of these ants, and we now come to deal more directly with this part of the subject. Upon making a breach in one of their castles, a general alarm is excited; the labourers retire within doors, and the vindictive troops appear at the point of danger. Immediately upon striking the wall, a soldier walks out, and, after ascertaining the nature of the danger, retires to give the alarm. Upon this, two or three more hurry out, and the breach is soon filled with soldiers, rushing out to defend their citadel, which they do with indescribable fury. In biting, they frequently strike their forceps on the wall, which makes a cracking noise, somewhat shriller than the ticking of a watch. The labourers within seem to understand this, and reply to it with a kind of hissing. "I one day," says Smith, "attempted to knock off the top of one of these hills with my cane; but the stroke had no other effect than to bring thousands of insects out of doors to see what was the matter, upon which I took to my heels, and ran away as fast as I could." "If in their rage," Smeathman says, "they come in contact with the hands or legs of their assailant, they make their mandibles meet through the skin at every stroke, and inflict considerable pain, while the blood from one of the wounds will stain the stocking to more than an inch in width." They never quit their hold, but will suffer themselves to be pulled limb from limb without any attempt to escape. They are thorough Spartans, and fight to the very last, disputing every inch of ground so well as often to drive away the negros, who are without shoes, and to make the white people bleed plentifully through their stockings.

Latreille has discovered a fifth degree of citizenship in these communities, which differ little from the workers, except in having the rudiments of wings, or rather wings folded up, as happens with butterflies in the state of crysalis. These are probably only workers in a more advanced state of growth, and it is equally probable, judging by the aid of a broad analogy, that Latreille is wrong in supposing that the soldiers are *perfect* neuters, and not undeveloped females, seeing that sex is a fundamental principle of all organised existence, and that in the case of bees and common ants, the supposed neuters are of this undeveloped kind.

THE PIGEON AND THE HAWK.

WONDERFUL things are often done and pass into oblivion, and no one knows of them. Mr. Waterton, the "*Wanderer*," has told us how he bestrode a monster alligator, and killed a snake of immense proportions, when his black companions all fled. And the traveller to Abyssinia has left it recorded as a wonder, how the migratory wanderers over the desert cut steaks off a living ox, and drive him on for a future operation. Now one day, as I stood at my door in Hammersmith, I saw a pigeon descend in the highway, making a long curving sweep, as of an arch, inverted—directly opposite where I stood, an old fashioned little watch-maker's shop was undergoing a sort of modern improvement, for the lower range of glass squares, together with the frames were all removed, to be replaced by larger ones, and being open at this time the bird entered, passing over the heads of the watch-maker and his man, who with their additional aids to vision, were quietly bending over their delicate work, and perching upon the top of a high clock against the wall, waited in patience the descent and ascent of his fierce pursuer; for in the same curve, and almost at the same instant, a hawk attempted to pounce upon the innocent and unoffending creature; how long the pigeon availed himself of his shelter and security cannot be told, but the watch-maker and man, were each equally scared at the sudden entry of a pair of large wings, and the equally rapid disappearance of the same. The back part of the shop was obscured by the restricted mode of letting in the light, and by the addition of a range of clocks filling a shelf in the window, and though they each looked up, yet, not seeing anything, they felt some deception not to be accounted for had occurred, and resuming their labour the creature passed out equally unobserved, but not without producing the same unpleasant impression—in a day or two the child of the watch-maker died, and now he and his man declared a presentiment of death had met their senses, for something not seen had rushed into the shop, and equally unseen had left it; and strangely enough connected this with the death of the child. This story coming to my ears I was obliged to contradict and explain the whole; and though it occurred in the face of the sun, and amidst a whirl of busy moving scenes, such as stage-coaches, and thronging people; yet I saw and explained it, and traced out on the top of the clock the indubitable marks of the creature's lodging place, and wrote it down as a wonderful thing.

THE YOUNG SWANS.

Some years ago the Earl of Jersey, in Osterly park, had a lake of water, which was ploughed by the graceful forms of elegant swans. Year by year the hatching of Cygnets was carefully attended to, and yet, ere these young swans had reached maturity, few or any were left. Those who had the care of the creatures were much troubled as to their disappearance; where can they go? how do they go? was often asked, and yet no one could tell. At last men were set to watch, and these persons failed to detect their disappearance. Foxes were at first supposed to run off with them, but these wary animals had never been known to venture in hot pursuit, after their prey in the eye of day, and under the observation of them who were alert for such visitors. Some said they were stolen and concealed until old enough, and then the thief sold them, but no human being was seen to approach either for one purpose or another, and beside, the swans kept pretty much a part of the water to which approach unperceived was impossible; at last a struggle ensued, and the broad wings of a pretty large bird flapped heavily upon the surface of the water, but down it went amidst much consternation of the elder branches of that delicate and downy race—the report was made of the mysterious disappearance, and the pond was dragged, when two immense pike or fresh water sharks—as they have been very properly described, was found—the stomachs of these creatures was variously and prodigiously gorged with piscatory, ornithological, and quadrupedical contents, for fishes, rats, and swans, had formed the staple commodity of sustentation, to these voracious animals no one knows how long. Even when caught, their fury was made apparent by their eating many of their own tribe who were caught with them, and were all put into a small reservoir together. These fierce tenants of the lake being removed, the swans in the future lived, multiplied, and increased.

THE RAT AND GOLD RING.

Nature has her own way of accommodating herself strangely to some of the most extraordinary conditions of life and being. A gold wedding-ring was lost by a lady, who for some reason removed it from her finger after supper, one night. Some three years afterwards, as the owner of the house came down stairs, puss, with all the solicitude of one accustomed to be praised for doing well, came purring and mewing to his feet, and laid quietly down close beside them a large rat, from which she had eaten the head. The neck of the dead thing was exposed, and as something metallic glittered, the owner of poor puss stooping to caress her, paid some attention to the substance; it was a ring, and it was imbedded in the flesh. How could it get there? and what ring was it? were questions passing hastily through his mind. By this time another inmate of the house came down stairs, and having his attention directed to the rat's neck, he proceeded carefully and scientifically to examine it. He soon pronounced the ring to be gold, to assure his friend it was a small one—and could not have passed over the head—but at a period of life when the creature must have been so very young as to have no very accurate idea of dimensions. Upon closer examination, it was found to be the lady's wedding-ring, lost so long before, and must have been carried away by the parent rat to the nest of a very little one, and being dropped into that quiet home the struggling blind little creature must have thrust its tiny head through the golden noose. Each day enlarged its size, making it more and more impossible for removing. It was now a permanent collar, but of such small dimensions that the wonder to us is how nature continued to permit her living demands to be supplied. Here were the two great canals of life to the brain, and other two great canals bringing the used blood away from the brain, the osophagus or gullet, and the trachea or wind-pipe; all compressed into the narrow space of a wedding-ring, and yet the creature lived—was fat and full of flesh. Nature must have been most accommodating, and in her efforts to sustain vitality in this little quadruped, must have done a wonderful thing to permit life, health, and vigour, to have had so long an existence.

AN ODD FISH.

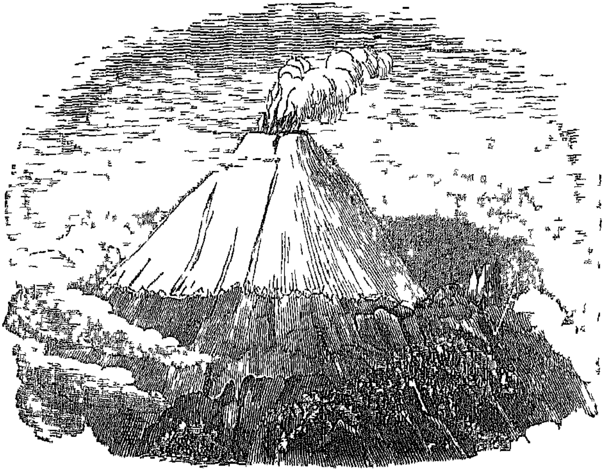
Some years since, one of those strange things occurred which prevents our reasoning about it, or accounting for it, upon ordinary grounds; pearl divers have but a short life, because of the trials to which their physical frame is exposed in their dangerous occupation. The leech gatherers of Germany die early; but cases are to be found of both, pearl divers and leech gatherers, living to an old age; they are rare, but they do occur, as if to assure us that while the pursuit is a sacrifice of life, yet nature holds on, clinging like a man drowning to his last refuge. In a lake or piece of water near Maidenhead, Berkshire, was found a large misshapen and unwieldy chub, so strange in its appearance, and unsightly in its movements, that the most apt Zoologist could not account for its lineal descent, or say if it was piscatory or amphibious. In a cage formed by the often-washed roots of a large elm tree, growing on the banks of this lake, was the creature found. At an early period of its life, when its sides were less spherical than at present, the animal must have obtruded itself into 'this cradle-like prison-house. Limited and restricted to a mere turn, the wonder is, that as force must have been used to have got in, why the same force was not exerted to get out; but here it was, after years must have elapsed, taking quite the form of the gnarled and struggling roots; and, instead of growing in length, the tail was all but reduced to the few prehensile bones joined to the vertebræ, the dorsal fin altogether obliterated, the belly hard as a boar's back, the scales like so much incrustation of baked mud, divided and subdivided into layers or laminæ; the nose so pushed in, and the gills so enlarged, that, when looked at full in the face, it had the appearance of a negro, whose leprous face had been despoiled of its shining and oily surface, and swollen by many mercurial preparations for its cure—indeed, its life and existence were matter of marvel; for, though unaffected by the tides, this water subsided and increased according to the heat of the weather, the dryness or rainy condition of the season. So extraordinary was it, that the more examination was devoted to its mystery of life, that all believed there were times when, like a hog, it must have had only the most muddy home, and a semi-fluid for its subsistence. When removed, to declare it reptile or fish, quadruped or biped, bird or insect, would have been very bold. Any person desirous might have worshipped it, without fear of breaking the second commandment; for it was really like nothing in heaven or on the earth, and yet it was declared to be of the tribe pisces, of the genus chub. Out of thousands which must have perished, if subject to such a circumscribed home and such a limited provision, this one, as a *lusus natura*, lived, and has obtained a record amongst WONDERFUL THINGS.

COTOPAXI, THE GREAT VOLCANO OF THE ANDES.

THE Andes are a vast series of parallel chains of mountains, which run along the western side of South America, and derive their name from a Spanish term, signifying copper, a mineral with which they abound. The immense length of the chain makes it obviously impossible to limit its description to such generalities as would arise out of a survey of the Alps, the Pyrenees, or any of the high lands of Britain. Their connection, and their enormous height, can also be accurately appreciated from a distance, and the great rents which divide them, and which are often so large that Vesuvius would be hidden in them, appear only like so many irregularities on the surface of a rock. The chain abounds with volcanic summits, the most beautiful and conical of which is Cotopaxi. This *volcano* is described by *Humboldt* as the most regular of all the colossal summits of the Andes; covered with snow and shining with dazzling splendour at sunset, Humboldt endeavoured to reach the summit, but failed, owing to the number of deep ravines which surround the cone and render the ascent to the crater impossible. The elevation of Cotopaxi is enormous, and our old neighbours Vesuvius and Etna are mere dwarfs compared with it. Vesuvius is three thousand nine hundred and thirty-two feet, and that of Etna ten thousand eight hundred and seventy-three feet. If one of these two mountains were placed above the other, the elevation of Cotopaxi would exceed them by four thousand and seventy three feet; its measurement being eighteen thousand eight hundred and seventy-eight feet above the level of the sea. Its eruptions have been on a scale commensurate with its *magnitude*. For *forty leagues* on its western side, the valleys are choked with fragments of pumice and cinders of trachytes, and the plains covered to a great depth with the same substances. In 1738, during an eruption, its flames are reckoned to have soared three thousand feet above the mouth of the crater. In 1744 the mountain was so prodigiously convulsed, that its internal uproar was heard distinctly at Honda, on the river Magdalena, a distance of more than six hundred miles. On the 4th of April, 1768, the quantity of ashes ejected was so great that in the towns of Hambato and Tacunga, the day broke at three o'clock in the afternoon on the terrified inhabitants, and at that hour lanterns were still in use in the streets The explosion which took place in 1803, was attended by awful consequences. At two hundred miles distance, Humboldt and Bonpland heard its noises day and night, like the discharges of a battery. For twenty years preceding, no smoke nor vapour had been observed to issue from the crater, but in a single night the dormant fires put forth their resistless energies, and the mantle of snow which had covered it for ages melted from the sides, and descended in a destructive deluge to the plain.

Mr. Lyell, speaking of the Andes which rise in Chili, says that from the forty-sixth degree of south latitude to the twenty-seventh degree, the line of volcanos is so uninterrupted that it is rare to find any intervening degree of latitude in which there is not an active vent. A year never passes in this province without the occurrence of shocks of earthquake, and about once in a century, or oftener, tremendous convulsions occur, by which the land has been shaken from one end to the other, and continuous tracts, together with the bed of the Pacific, have been raised permanently from one to twenty feet and upwards above their former level. Villa Rica, one of the principal volcanos in this region, continues burning without intermission, and is so high that it may be distinguished at the distance of one hundred and fifty miles.

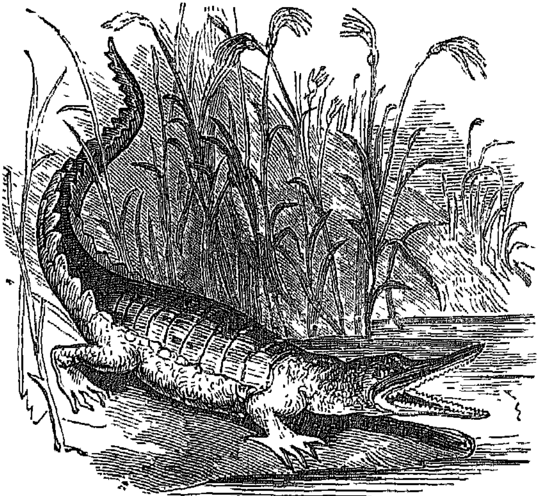
The Andean earthquakes frequently rage with the most destructive violence, and are the natural concomitants of the volcanic action displayed in the craters of Cotopaxi and other mountains. "On the 19th of November, 1822," says Mr. Lyell, "the coast of Chili was visited by a most destructive earthquake, the shock was felt simultaneously throughout a space of one thousand two hundred miles from north to south; St. Jago, Valparaiso, and some other places were greatly injured. When the district round Valparaiso was examined on the morning after the shock, it was found that the whole line of coast, for the distance of above one hundred miles, was raised above its former level. At Valparaiso, the elevation was three feet, and at Quintero about four feet. Part of the bed of the sea remained bare and dry at high water, with beds of oysters, muscles, and other shells adhering to the rocks on which they dwelt, the fish being all dead, and exhaling a most offensive effluvia. An old wreck of a ship, which before could not be approached, became accessible from the land, although its distance from the shore had not been altered. It was observed that the watercourse of a mill at



COTOPAXI THE ANDES.

the distance of about a mile from the sea, gained a fall of fourteen inches in little more than a hundred yards, and from this fact it is inferred, that the rise in some parts of the inland country, was far more considerable than on the coast Part of the coast thus elevated, consisted of granite in which parallel fissures were caused, some of which were traced for a mile and a half inland Cones of earth, about four feet high, were thrown up in several districts, by the forcing up of water mixed with sand, through funnel-shaped hollows—a phenomenon very common in Calabria Those houses in Chili, of which the foundations were on rock, were less damaged than such as were built on alluvial soil. The area over which this permanent alteration of level extended, was estimated at one hundred thousand square miles. The whole country, from the foot of the Andes to a great distance under the sea, is supposed to have been raised, the greatest rise being at the distance of about two miles from the shore. The shocks continued up to the end of September, 1823; even then, forty-eight hours seldom passed without one, and sometimes two or three were felt during twenty-four hours.

THE CROCODILE.



THE true Crocodile inhabits the river Nile, and is a member of the great family of reptiles, the different members of which are so well known under the forms of turtles, tortoises, snakes, and lizards. The tribe to which the crocodile belongs is called *Loricata*, and includes the true crocodile of Egypt, the alligator of America, and the gavial or crocodile of the Ganges.

In all of these animals the body is enclosed in a sort of plate-armour, of which the separate portions are closely fitted together, and are capable of great resistance. Another character by which they are distinguished, is the flattening of the foot, which is furnished with a kind of web between the toes, and fits them for the aquatic life to which they are so much attached. Some of them attain to the length of thirty feet, and a circumference of seven or eight feet; so that, excepting the elephant, the rhinoceros, and the hippopotamus, there is no terrestrial animal exceeding these in dimensions.

The crocodile and his allies the alligators and gavials are all capable of moving inland, but the greater number prefer the water, and besides the expansion of the foot, they are adapted for swimming, by the lateral compression of the tail, which acts as a large and powerful fin. They are all inhabitants of tropical pools and rivers; the South American species making excursions, in calm weather, to the open sea, where they search for prey in the waters, or gorge it on the shore. They are all purely carnivorous, and destroy their prey upholding it beneath the surface of the water until it is drowned; the position of their nostrils, and the arrangement of the air passages being such that they are enabled to breath during the process. They cannot swallow under water, and it is their habit to hide their prey in holes on the banks of the rivers, where they suffer it to lie until it is putrid, when they devour it. Of late years scientific men have thrown doubt upon the alleged habit of the crocodile in never eating its food until it is putrid, and Mr. Gosse, whose reputation as a naturalist is quite equal to his fame as a writer, confirms the statement in his recent work on Jamaica, and asserts that he has had numerous proofs in the case of the alligator that it never eats its food until it has submitted it to a process of putrefaction.

With the ancient Egyptians, the crocodile was reverenced both as a symbol and an object of worship. According to Diodorus Siculus, it was a crocodile which saved king Menas from drowning; and the grateful king, in commemoration of the act, founded a city, called the City of the Crocodiles. This supposed king was the Deus Lumus or sacred emblem of the moon, known to the Persians under the names of Meen and Man, and worshipped under the same title; and the history of the supposed saving of king Menas is a sacred tradition and bears reference to the saving of Noah by the ark, which was called in Greek the Kampsha, whence we have Campsa, one of the names of the crocodile, equivalent to Cayman, the modern name of the alligator of South America. Thus the Egyptian worship of the crocodile is a remnant of the ancient history and worship of the ark and the crocodile, when employed by the Egyptians as an hieroglyphic, has a remote reference to the Noachian deluge. The veneration for the crocodile is supposed to be exhibited in that strange habit which the Egyptians fostered, of embalming the bodies of crocodiles; though it has been asserted by late writers, that the reason why the Egyptians embalmed the corpse of crocodiles was to prevent the direful efforts of their putrefaction in a climate where plague and pestilence were so common.

Certain it is, that vast numbers of crocodiles were embalmed in the most careful manner, and in one cave, called the Cave of Crocodiles, visited a few years since by Mr. Mullen, thousands of crocodiles were found preserved in this manner, the carcases being prepared with spices and wrapped in the finest linen.

On the banks of the Nile, where crocodiles are, frequent encounters with them are by no means very rare. The power of the creature is immense, but owing to its peculiarly shaped neck, it cannot move the head very far from side to side, and thus a sure means of escape presents itself in those rare cases in which it leaves the water in pursuit of human prey.

Respecting the crocodile of the Nile, many remarkable stories and anecdotes are told; one of which, related by Herodotus, deserves particular mention here. The ancient historian says that the crocodile is infested by a kind of gnat or fly, myriads of which swarm on the banks of the Nile; and that, when annoyed by these pests, which get into its mouth and nostrils, the creature is relieved by a little bird called trochilus, which enters its mouth and picks from his teeth the bdellæ or gnats which adhere to them. It is equally wonderful as curious, that this story of the old writer should be confirmed by modern travellers, who have seen the trochilus perform the part of a living toothpick in exactly the manner described by Herodotus. It is found that gnats swarm in vast plenty on the borders of the Nile, and attack the crocodile when he comes to repose upon the sand. His mouth is not so closely shut but that they can enter, which they do in such numbers, that the interior of his palate, which is naturally of a bright yellow, appears covered with a dark brown crust. The insects strike their trunks into the orifices of the glands, which abound in the mouth of the crocodile; and the tongue of the animal being immovable, it cannot get rid of them. It is then that the trochilus, a kind of plover, hastens to his relief; the crocodile always taking care, when he is about to shut his mouth, to make certain movements which warn the bird to fly away. Thus the ancient story, says a writer in our able contemporary, "Notes and Queries," is not so unreasonable as might be thought. It is a matter of every day observation, that gnats will attack bulls and other large terrestrial animals of the fiercest nature, and that wagtails and other insectivorous birds will peck the insects from the muzzles of the quadrupeds, while in India it is common to see the ox approaching his eye deliberately to the ground, by holding its head on one side, to enable the *Mina*, a species of starling, to take an insect from the hairs of the eyelid. There appears, therefore, no reason why the crocodile should not have recourse to similar aid in a similar necessity. Mr. Curzon, in his "Monasteries of the Levant," bears witness to this, and describes the trochilus as of the plover species, and as large as a small pigeon. According to this gentleman the trochilus not only frees the crocodile of flies, but warns it of danger. When out crocodile shooting one day, he espied one of the reptiles asleep on a bank, and approached cautiously to get a shot at him; when he observed that he was attended by a *ziczac* or trochilus. "The bird," says Mr. Curzon, "was walking up and down close to the crocodile's nose. I suppose I moved, for it suddenly saw me, and instead of flying away as any respectable bird would have done, he jumped up a foot from the ground, screamed ziczac! ziczac! with all the powers of his voice, and dashed himself against the crocodile's face two or three times. The great beast started up, and immediately spying his danger, made a jump into the air, and, dashing into the water with a splash which covered me with mud, he dived into the river and disappeared.

Illustrative of the incapacity of the crocodile to attack a foe whom he cannot fairly face, is the adventure of the intrepid Waterton, when engaged in his memorable wanderings in South America. He relates that, having long desired to capture a living cayman or alligator, he set off with a party of Indians to a point of the river Essequibo, where they were known to be numerous, and there laid the baits and snares judged to be necessary. Failing in their first attempts to attract a cayman, they sailed higher up the river, and there suspended a dog on a hook, at the end of a pole jutting out from the bank above the water. A huge specimen attracted by the putrescent effluvia of the bait, soon made a snap and was hooked accordingly. Waterton immediately made preparations for landing him uninjured, that he might obtain a perfect skin for preservation. Strict injunctions were given to his attendants not to shoot at or maim the reptile in any way, but to effect a landing with the least possible injury to its skin. All hands were called, and vigorous efforts made to haul the beast on shore by the rope to which the bait-hook was attached. The Indians pulled and the cayman floundered, but as soon as they had hauled him to the bank he made a desperate plunge forward, and threatened to destroy them all. Waterton, with firm hand and fearless in heart, seized a mast belonging to the canoe, and hastily wrapping a sail round it, met the cayman with it, and thrust it between his open jaws. The concussion was so great as to paralyse the cayman for a moment, for he had in fact, swallowed a portion of the sail and mast, and Waterton, taking advantage of his perplexity, dashed past his head, and leaping upon his back, rode in triumph on to the dry shore. The cayman was of course soon despatched, and its skin (so we believe, quoting from memory) is still preserved among the trophies of daring adventure at Walton Hall. in Yorkshire.

HYPOCHONDRIACS.

Hypochondriacis is a strange persistency about something that all the world knows is not so. Dr. Warren had an old rich planter committed to his care, who believed his head was turned; so that he saw everything behind him, and persisted in being dressed with his coat, vest, and smalls, all so buttoned up. Mr. Wesley had a preacher, who having been sensitive about a singing, hard-working shoemaker, whose shop was directly opposite his study, and to whom he sent many messages, one of which brought the man personally before him, which so alarmed him, that the man in his indignant behaviour said, Now that you have sent for me, I've a great mind to leap down your throat, lapstone and all; which threat the excited man declared was put into execution; and awaking from a swoon into which the fright had thrown him, he remained a victim to the impression. Dr. Darwin tells us of a gentleman who, though surrounded by luxuries, kept his carriage, and never moved without attendants, believed himself a tea-pot; and thought every one who touched him must be scalded. My friend, John Hodges, was a short-hand writer, and engaged variously with many of the first-class cases for Parliament, Chancery, &c., exhausting days and sometimes nights in reporting, and following this up, by transcribing and getting *fair copy* for the press, suffered at first from violent constipation of bowels, inflamed eye-lashes, and a dull heavy pain upon the top or crown of his head. At last little black creatures crawled before his eyes upon everything; on going to bed his white bed curtains were covered over with books, each shut, but appeared to have heads and feet like tortoises; and walked in *radi* towards him. As a centre, the counterpane was equally covered, and he said he could read the gilded titles of the books as the backs came nearer, which they constantly did; at last a new, and for some months, a permanent impression came over him, and he believed himself a walking fruit-tree; at which, be he where he would, people would pluck him; and when any one not aware of the delusion came directly up to him, or thrust accidentally against him, he would cry out piteously and implore of them not to pick him to pieces; and assured them every apple they gathered, was an eye, or a limb, and not fruit, as they believed it; that they were the persons deluded and not him. Strange to say, this gentleman followed out his pursuits with accuracy; and while so engaged, never complained until his task was fulfilled; then, as if the mind had filled up its measure of sane duty, it fell back into its strange reverie; at last, diverted by a cousin, by whose habits of bathing all the year round in the river Thames, he was induced to plunge in the cold stream on a frosty morning in November; from that moment bodily disease, consisting of a slow febrile action, went on, and medical skill called in to cure that, cured the mental one also; and he was never known to mention his hypochondriacism again.

A WONDERFUL CONTINENT.

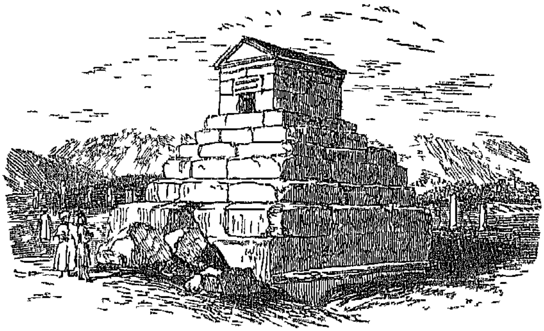
THERE is something about Africa that is wonderful. Whether it be the physical confirmation of its continental territory, its black population, its gigantic and gloriously-coloured vegetable world, its wild creatures, its swamps and marshes, its mighty old cities, or its more modern civilization, Africa is a wonderful place. Its form, for instance, is nearly round, or as Gyot says, elipsoidal; it has no peninsulars, nor does it admit of the waters of the ocean encroaching upon it as do other continents; it has no bays, and therefore has a larger surface proportionally than any other of the continents; for the line of coast consists only of about fourteen thousand geographical miles, while the surface presents eight million seven hundred and twenty thousand square miles, cut into by the ocean and inland seas. Europe is materially dissimilar, and has three thousand *more* miles of coast than that of Africa; so that while Africa has one mile of coast she has six hundred and twenty-three miles of surface, while Europe has one hundred and fifty miles of surface for one of coast. The whole population is almost like ebony for blackness, but varying very much in features, so that the dwarfish and monkey-like Bosjesmans, and the dignified and educated Egyptians, the hardy and war-trained Assyrian, and the soft and gentle central African, are all of one blood, and the inhabitants of one continent. The sons and daughters of Africa have been stolen from time beyond recollection, taught by the benevolent, and brought into war hordes at the bidding of one conquerer after another; and yet the territory is unexplored, the rivers untraced, the zoology unread, and the botany imperfectly developed. Adorned by the most gorgeous scenery, and mantled over in many a widespread district by a floral produce unequalled for colour and magnitude, we are for a time lost in surprise and wonder, that man, the lord of the soil, is not better prepared to reduce the desert, navigate the river, or culture the soil. To take advantage of matter and present now, as in the days of Babylon and Egypt, that field of mind that must triumph wherever developed, *Africa remains a monument hierogliphically inscribed*; and we are but waiting the age in which the men shall live who shall decipher her wants and give her an education socially, artistically, and politically, by which she shall take her place amongst the south and the east, and rise to her full modicum of mental and moral height.

THE TOMB OF CYRUS.

The marble tombs that rise on high,
Whose dead in vaulted arches lie,
Whose pillars swell with sculptured stones,
Arms, angels, epitaphs, and bones,
These, all the poor remains of state,
Adorn the rich, or praise the great. PARNELL.

CYRUS the Great, the founder of the Persian empire, is usually believed to have been the son of Cambyses king of Persia, and was born probably about the year 590 B.C. According to Herodotus, Cambyses was a man of mean origin, who had married the daughter of Astyages king of the Medes. Astyages had had a dream in which it appeared to him that one of the sons of his daughter would deprive him of his kingdom; and to prevent this, if possible, he had married Mandane to a prince of low estate. Further to frustrate the fulfilment of his dream, he ordered Harpagus, his minister, to destroy the child of Mandane, but Harpagus gave it to the care of a shepherd, by whose wife the infant Cyrus was cherished.

One day, as the neighbouring children were at play together, Cyrus was chosen king; and having punished with some severity one of his little playfellows for disobeying his commands, was complained of to Astyages by the parent of the child. The prince sent for Cyrus, and observing something



dignified in his air, together with a resemblance in his face to his daughter Mandane, made inquiry into the matter, and discovered that Cyrus was his grandson. Harpagus encouraged Cyrus to go into Medea, and promised to furnish him with forces, in order that he might take possession of the country and depose Astyages. At length he defeated Astyages and possessed himself of Medea. He conquered Crœsus king of Lydia, overthrew the Babylonians, and after a wonderful career of success, established an extensive empire in Asia. At length, having engaged in war with the Scythians he was defeated, and slain in battle by their queen, who caused his head to be cut off and put into a bag full of blood, with these sarcastic expressions—"*Now gloat thyself with blood, for which thou hast ever thirsted!*"

According to Zenophon, the education of children was regarded by the ancient Persians as the most important duty, and the most essential part of government. Boys were brought up publicly and accustomed to exercise and abstinence. Cyrus was educated in this manner, and surpassed all of his age in aptness to learn, and in courage and address in accomplishing whatever he undertook. At length initiated into war, he took command of the army sent against the Babylonians by his uncle Cyaxares, and in all his campaigns displayed great ability, virtue, and prudence. In substance, Zenophon's account of his life does not differ from that of Herodotus, but in regard to his death, Zenophon says it happened in his bed after a long and prosperous reign, full of years and glory.

The kings of Persia were consecrated at Pasargadæ, and here was the tomb of Cyrus, of which Strabo and Arrian have given a description taken from the work of Aristobulus, who had visited the spot. According to their description, the tomb was situated in a well-watered park, and was surrounded by numerous trees. The lower part of it, which was solid, was of a quadrangular shape, and above it was a chamber built of stone, with an entrance so very narrow that a man could with difficulty get into it. When found by Alexander the tomb had been broken open by robbers, who cared not for the honour of the great national hero, who for more than two hundred years had slept in it undisturbed. When entered by Aristobulus, according to the command of Alexander, he found in it a golden couch, a table with golden cups upon it, a golden coffin, and many beautiful garments, swords, and chains. The golden coffin that contained the embalmed body of the monarch was broken open by the plunderers who had first entered the tomb, and who after throwing the corpse from its resting place, were unable to carry off the booty on account of its weight. Within the tomb the following epitaph in the Persian language was discovered—"O man! whosoever thou art, and whencesoever thou comest (for come I know thou wilt), I am Cyrus, the founder of the Persian empire. Envy me not the little earth that covers my body."

WONDERFUL SPRINGS.

All the great rivers which flow so magnificently through Europe and America, have their sources in springs. There are a variety of kinds of springs in the world. There are springs which flow unceasingly, without increasing or diminishing in size; there are others that increase and diminish periodically; and there are others which at times gush forth with fury, and then altogether subside. There is a spring at Colmers, in Provence, which stops every seven minutes. The spring of Tonsanche, in Languedoc, flows every day for seven hours, and then stops for nearly five. At Guildford, in Connecticut, there is a spring, the water of which will evaporate if corked in a bottle and hermetically sealed. It is recorded, there is a spring in Mount Sorache, whose waters boil at the rising of the sun. In England, Wales, and Spain, there are springs which flow periodically; and under the rocks of Giggleswick, in Yorkshire, there is a spring which ebbs and flows several times in the course of an hour, and when the weather is very hot or very dry it ceases to flow. The Bullerhorn, a cold water spring in Westphalia, rises with a great noise.

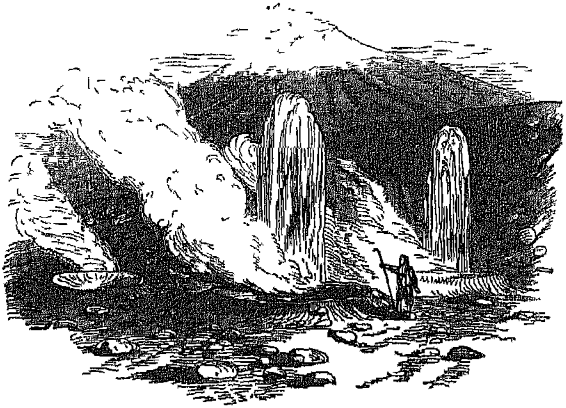
One of the most romantic fountains mentioned in ancient history, was called "the Fountain of the Sun," and situated near the Temple of Jupiter Ammon. It is recorded by Herodotus and Diodorus Siculus, that early in the morning the fountain was warm, as the day advanced it became progressively cool. At sunset it again became warm, and continued to get warmer as night advanced, at midnight it became quite hot; and again as morning dawned, it became cool. In the forest of Dodona, there was a spring equally curious. It is said to have the power of lighting a torch; at noon this wonderful spring was dry, at midnight full. Pliny, the younger, describes a spring near Lake Larian, which increased and decreased three times a day. The ancients attributed peculiar healing and renovating powers to fountains. That of Arethusa was supposed to have the power of forming youth to beauty. Some of the most remarkable springs are distinguished for their medicinal or poisonous properties. Philostralus mentions one that occasioned the leprosy. We read of others that caused immediate death, or the loss of memory; and of others that cured the leprosy, that gave a peculiar loudness to the voice, or restored the memory. Pliny speaks of two fountains, one in India, the other in Ethiopia, which being impregnated with sulphur, had the property of oil in respect to burning. A similar property is given to a river in Cilicia, and a fountain near Carthage, by Vitruvius. Herodotus relates that in the country of the Atlantis, in Africa, was a hill of salt, on the summit of which bubbled a spring of *fresh* water. In another place we will enter into more particulars connected with remarkable springs, and shall now content ourselves by giving a description of the Geysers, the wonderful boiling springs of Iceland. No springs have created such an interest in the minds of travellers and scientific men as the Geysers.

"The Geysers are situated in the south-west division of Iceland. About one hundred of them play within a circle of two miles. These rise in a thick bed of lava derived probably from Hecla, a volcano whose summit can be seen from them at the distance of some thirty miles. It rises out of a spacious basin which surrounds a vent or a well. The basin consists of a mound which has been formed around this well by siliceous or flinty matter which has fallen from the spray of the water, and which has settled as a circular incrustation. The diameter of the whole basin is fifty-six feet in one way and forty-six in another. In the centre of the basin is the well, shaft, or pipe which goes down seventy-eight feet deep, and which is from eight to ten feet in diameter. At intervals this basin is quite empty, but usually it is filled with water that boils as if in a kettle on the fire.

Before an eruption of the Geysers takes place the sounds of rushing water is sometimes heard in the chasms beneath the surface; for here, as in the districts of Ætna, rivulets and brooks flow in subterranean channels formed in porous and cavernous lava. The Geysers jet and rest alternately, and but few of them play for more than five minutes at a time. At intervals they throw up an immense quantity of hot water and steam. When an eruption of the boiling water begins, subterranean noises are heard which resemble the distant discharges of cannon, and these are repeated rapidly but irregularly.

Before the eruption actually takes place the water heaves and rises several times in the well or the pipe to which I have referred, and then a column of water jets up suddenly from the basin to the height of ten or twelve feet, accompanied with clouds of steam. The first column rises as if it had burst, or had been snapped from the water below. The next jet rises about fifteen feet, and then a quick succession of about eighteen jets in five minutes take place, which rise about fifty feet high. After the last jet, which is the most furious of all, the water suddenly disappears from the basin, and sinks down through the pipe or well in the centre. It sinks about ten feet, and then begins to rise gradually. Its temperature in this state is about 209° Fahr. There have been many instances in which these jets of boiling water have risen in columns from a hundred to a hundred and fifty feet high. A great rush of steam almost always follows the subsidence or disappearance of the water in the well."—*Popular Educator*.

The last distinguished traveller who visited the Geysers, is Madame Ada Pfeiffer, a lady who has travelled almost all the world over. While journeying on to see these extraordinary phenomena, she passed through innumerable places. She says, "After we had already travelled about twenty-five miles, we came by the most remarkable object I had ever met with; this was a river of a most peculiar bed. This river-bed is broad and somewhat steep, it consists of lava strata, and is divided lengthwise in the middle by a cleft eighteen to twenty feet deep, and fifteen to eighteen broad, towards which the bubbling and surging waters rush, so that the sound is heard at some distance. A little wooden bridge, which stands in the middle of the stream, and over which the high waves constantly play, leads over the chasm. Any one not aware of the fact, can hardly explain this appearance to himself, nor understand the noise and surging of the stream. The little bridge in the centre would be taken for the ruins of a fallen bridge, and the chasm is not seen from the shore because the foaming waves overtop it. An indescribable dread would seize upon the traveller when he would behold the venturous guide ride into the stream, and he is obliged to follow without pity or mercy.



THE GEYSERS.

The whole passage through the stream is so peculiar, that it must be seen, and can scarcely be described. The water gushes and plays on all sides with fearful force; it rushes into the chasm with impetuous violence, forms waterfalls on both sides, and breaks itself on the projecting rocks. Not far from the bridge the cleft terminates, and the whole breadth of the waters falls over rocks thirty to forty feet high. The nearer we approached the centre, the deeper, more violent, and impetuous grew the stream, and the more deafening was the noise. The horses became restless and shy, and when we came to the bridge, they began to tremble, they reared, they turned to all sides but the right one, and refused to obey the bridle. With infinite trouble we at last succeeded in bringing them across this dangerous place.

The valley which is traversed by this peculiar river is narrow, and quite enclosed by lava mountains and hills; the inanimate, silent nature around is perfectly adapted to imprint this scene for ever on the traveller's memory.

This remarkable stream had been the last difficulty, and now we proceeded quietly and safely through the beautiful valleys till we approached the Geyser, which a projecting hillock enviously concealed from my anxiously curious gaze. At last this hillock was passed, and I saw the Geyser with its surrounding scenery, with its immense steam pillars, and the clouds and cloudlets rising from it. The hill was about two miles distant from the Geyser and the other hot-springs. There they were, boiling and bubbling all around, and through the midst lay the road to the basin. Eighty paces from it we halted. And now I stood before the chief objects of my journey; I saw it, it was so near me, and yet I did not venture to approach it."

Madame Pfeiffer, like others before, had to wait some time before she could see a *good* eruption. It is usual to watch through the night, in order not to miss one. The heroic lady says, "I sat sometimes before and sometimes in my tent, and listened with anxious expectation for the coming events; at last, after midnight—the witching hour—I heard hollow sounds, as if a cannon were being fired at a great distance, and its echoing sounds were borne by the breeze. I rushed from my tent, and expected subterranean noises, violent cracking, and trembling of the earth, according to the descriptions I had read. I could scarcely repress a slight sensation of fear; to be alone at midnight in such a scene is certainly no joke. These sounds were repeated, at short intervals, thirteen times; and each time the basin overflowed and ejected a considerable quantity of water. The sounds did not appear to proceed from subterranean regions, but from the violent agitation of the waters." But Madame Pfeiffer did not realize her expectation this time. She had to wait patiently one or two nights longer. But at last she saw it to perfection. "Words fail me," she says, "when I try to describe it; such a magnificent and overpowering sight can only be seen once in a lifetime. All my expectations and suppositions were far surpassed. The water spouted up with indescribable force and bulk; one pillar rose higher than the other, each seeming to emulate the other. When I had in some measure recovered from the surprise and regained composure, I looked at my tent. How little, how dwarfish it seemed, as compared to the height of these pillars of water! And yet about twenty feet high, I calculated, though my calculation may not be correct, that one would need to pile up five or six tents to have the height of one of the pillars. Without exaggeration, I think the largest spout rose above one hundred feet high, and was three to four feet in diameter."

A MAN ALL BONE.

NATURE in many of her processes is thrown into confusion, and the laws to which ordinarily she yields implicit obedience, are, for a time, turned aside; some rare instances of the hair losing its colour, falling off, and standing on an end, have come under our notice; the vitreous humour of the eye, coagulated and ossified; even the crystalline lense has been found to become bony, and occasionally bony particles have been found pendant from the inner cranium, or *piamater*, which must cause permanent and incurable epilepsy. But in Sandy, in Bedfordshire, a man who had been for many years a gardener to an honourable lady, died a few years since a perfectly rigid being. In the severe winter of 1811, he was one of a festive party at the great house, where, with his companions, he had drank pretty freely of old and strong ale: he was reminded that his fires must be expiring, and assured it was freezing hard, and that unless he hastened to secure the heat his exotics and plants in general would suffer. Rising with the intention of making up his stoves for the night, he boisterously departed, saying how soon he would be back, and rushing out of the house, he essayed to cross the park, in the centre of which was a pond, through which a river ran, preventing its permanently freezing: over this pond he attempted to pass, but the ice breaking, the man was immersed; and getting out on the other side, he arrived at his conservatory, where, having attended to his flues, he lay down on the top of one in his wet clothes, and soon fell asleep. On awaking he was hot, stiff, and thirsty: he soon dragged himself away to his bed, where for nineteen weeks he lay suffering extremely from what was called rheumatic fever, after which he gradually recovered; but as soon as he attempted to attend his business he was acutely pained at every joint: soon a redness appeared on each protruding part, and pus was formed, which soon changed from a yellow to a white chalky deposit. After a time the joints became rigid, and, at last, so unwieldy and unelastic was his frame, that but the most imperfect motion took place. The man seemed in good health, so to speak, for he could eat and drink, and sleep too, without restriction; but became so helpless that, like a log he was laid down, like a log he was raised up; he always stood, shuffled a little, but could not be said to use locomotion. At last he died, and was found to be so knitted together, so joined, that he might be said to be all bone, without a joint in the least flexible.

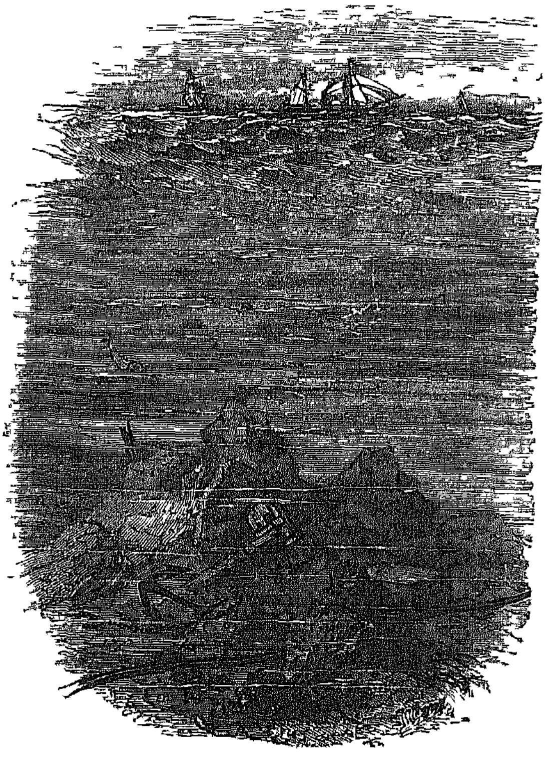
In the College of Surgeons, London, there is a preserved specimen of a human osseous trunk which, by the strange transformation of its tissues, must have been reduced to the same inflexible condition. The valves of the heart become ossified, and do not collapse freely. Some of the arteries have sometimes a series of laminæ or osseous coatings over them, and this, as a disease, though uncommon, is not properly accounted for.

CHEMICAL PHENOMENA.

No science has of late years revealed so many of the wonders of Nature as chemistry. Nature, in fact, is a huge chemical laboratory, in which every day a vast multitude and variety of experiments are performed; and it is by closely watching these, and applying such other tests as are thereby suggested, that we become acquainted with the mutations and transformations, the differences, identities, and uses of that marvellous variety of things with which we are surrounded. In the early stages of this science, when in truth it was so little understood as to be not yet worthy of the name, Alchemy was a favourite belief. Men spent their fortunes and risked their lives in the hazardous, and as it has hitherto proved, the impossible attempt of transmuting the metals—turning them into gold. And this belief, in some of its thousand shapes, has never entirely disappeared from among the devotees of Chemistry, although the inductive philosophy, which is simply *the science of facts*, is absolutely fatal to it, as no sufficiently authenticated and demonstrative experiment has ever been made in its support. And yet chemical philosophers every now and then fancy themselves standing upon the very confines of this discovery. At the meeting of the British Association of last year, M. Dumas, of European celebrity, unsurpassed by any living man, thrilled the audience by the announcement of a theory which teaches the possibility of converting *one distinct* elementary substance into *another*,—a doctrine which no human experiment has yet verified; and our own cool, careful, and inductive Faraday also declared that such was his belief, and that he had actually attempted to realise the fact. Allotrophism, a certain chemical phenomena, is a remarkable instance of the subtilty of Nature, when the *same substance* exhibits *totally opposite properties.* "Thus phosphorus which, under ordinary circumstances, is a translucent, pale, waxy-looking substance, *ignitable by the heat of the hand, very fusible, and very poisonous,* becomes, by the simple *application of heat,* deprived of all these characteristics, and may be *carried about in the waistcoat pocket, handled, and swallowed with impunity,* and acquires a blood-red colour with complete opacity; and yet in each state it is phosphorus, and nothing but phosphorus." The diamond, and charcoal, and graphite, or black-lead, are also instances in which a *single element, carbon,* exists in three different states each possessing distinct and strongly marked dissimilar characters. If we pass into the region of organic chemistry these facts exist in still greater abundance. Hydro-carbon compounds furnish remarkable examples of substances which, although identical in composition, are now gaseous, anon liquid, now solid, then amorphous, or crystalline,—throwing into the shade by their varied appearances the many and confounding hues of the chamelion, and mocking the efforts of our tiny intellects to comprehend them. Yet, despite these differences in appearance and effects, the elements have never been proved to be other than the same,—the same, "one and indivisible." Well might the poet of Israel exclaim, "How marvellous are thy works, O Lord!"

THE SUBMARINE ELECTRIC TELEGRAPH.

One of the greatest marvels of modern science is the adaptation of electricity as a means of communicating intelligence to distant places. By this extraordinary agency the natural difficulties of *time* and *space* are annihilated. With a rapidity, of which it is impossible to form any adequate conception, our ordinary sensorial ideas of transit affording no appreciable example, intelligence travels from city to city, and from continent to continent, with such lightning despatch, that the slow instrument and process of language fails to describe it; for in less time than the words can be written, may, before their sound has well fallen upon the ear, and even while the organs of speech may be still employed in the act of articulation, this wondrous messenger may be dotting them down at a distance of hundreds of miles. Such a fact is scarcely to be believed, and yet this statement contains no inversion of the truth or element of exaggeration; for we are told, that if



THE SUBMARINE ELECTRIC TELEGRAPH.

it were possible to encircle the globe *eight times* with telegraph or copper wire, the electric current would travel the whole distance in a second of time. "Give me but an unlimited length of wire," exclaimed an *electrician*, "*and I will girdle the universe with a sentence* in forty minutes." This electricity, observe, is as old as the earth. Hidden from the gaze—except when "God has spoken in the clouds"—it has also eluded the use of man, for purposes of communication, for upwards of six thousand years; while it has been reserved to our own time, and to the children of science, who still dwell in the midst of us, to make it subserve the purpose of transmission of thought and knowledge.

It is now about a century ago since the discovery was made that the electricity of a charged Leyden jar, or battery, would pass instantaneously through a great length of moist earth. Voltaic electricity has more recently been discovered to possess the same power. But the submarine adaptation of electricity, in the Baconian sense, was first discovered by Professor Morse, of the United States, in 1842; and in 1844, he submitted his subaqueous plan to the House of Representatives.

"That steed called lightning (says the Fates)
I own'd in the United States;
'Twas Franklin's hand that caught the horse,
'Twas harness'd by Professor Morse."

Many other scientific men, both in England and on the continent, knew that water was a powerful conductor of electricity; but the *application* of the theory to a practical end was first made by the American philosopher. Nor is this the only instance in which American enterprise has stolen a march upon the more dilatory achievements of other countries, for the passage of the Isthmus of Panama affords another and more recent instance of the indomitable energy of that great people. While others are content to *talk* they *act*.

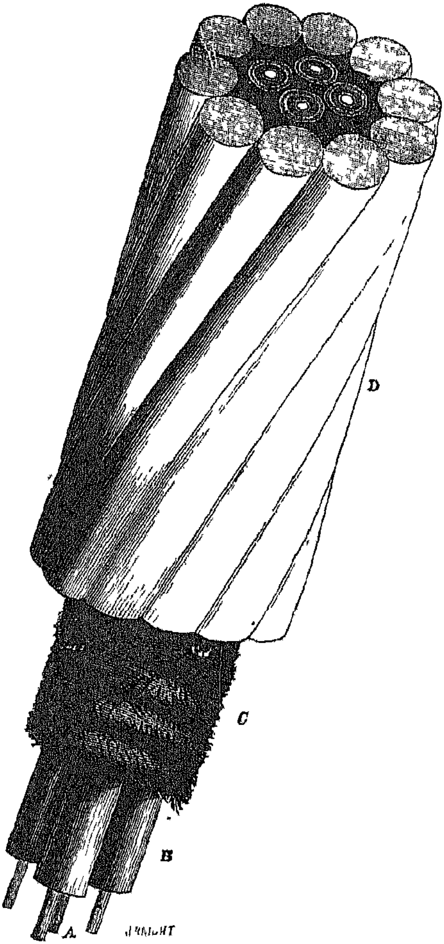
In the autumn of the year 1843, Professor Morse, sustained by the favourable regard of the American Institute, determined to bring before the public of New York an experimental demonstration of the practical utility of his electro-aquatic scheme, by uniting Governor's Island with Castle Garden, a distance of about a mile. He was successful in the preliminary business of submerging his wires, properly insulated, and began to operate; but after receiving only two or three characters, was deeply mortified to have to submit to an abrupt interruption of his experiment, caused by the anchor of a vessel, which accidentally severed them. Nothing daunted by present discomfiture, he immediately determined to renew the experiment, guarded by the caution of so arranging the wires as to prevent a recurrence of a similar disaster. By this experiment, it was discovered that the electricity passed the river in quantity proportioned to the size of the plates in the water, and that the distance of the plates affected the result. Professor Vail, one of Morse's assistants, subsequently crossed the river Susquehanna, at

Havre de Grace, a distance of one mile, with the most triumphant success. The next application of this discovery was made by the Electric Telegraph Company and Captain Taylor, in the Submarine Telegraph which is laid across the English Channel, and connects the house of the Admiral in the Dockyard of Portsmouth with the railway terminus at Gosport. Thus there exists a direct communication from London to the official residence of the Port-Admiral at Portsmouth.

The success of Professor Morse's experiment at New York emboldened him to theoretically speculate upon a more gigantic undertaking—a scheme for telegraphing across the *Atlantic* and the Pacific—and in this he had a host of disciples and supporters. But the difficulties and expense which, without the submerging of wires across lakes and rivers of much less extent than the span of the Atlantic, have hitherto prevented the supporters of this Anglo-American idea from being carried into effect. Nevertheless, an American editor memorialized Congress for funds—"an appropriation"—to construct a telegraph "right away" across the Atlantic. He purposed carrying the necessary wire on board steamers, and reeling it off a huge spool; and maintained that the wire of its own weight would sink down to a point where its gravity would be equalled by that of the water, at which point it would remain in suspension, and be below the line of travel of the monsters of the deep and the current of the sea.

It is, of course, impossible to say, with anything like certainty, whether this "rather attractive" idea will ever become an object of real existence, thereby adding to the daily increasing wonders of modern enterprise and scientific skill; but in the face of what has already been accomplished, we would not hazard a negative conjecture, though the difficulties were a thousand times greater than they obviously are. Looking at many modern achievements in various departments of science, and contrasting them with the sceptical demurs of the "prophets" of a former age, and even of our own time, it would be almost equal to doubting what our own eyes have seen, to circumscribe, even within the limits of an apparently extravagant conjecture, those possibilities which the indomitable energy and illimitable ability of man may in future time accomplish.

In about twelve months after the curiosity of the people of the great western Republic had been excited by actual experiment, Mr Walker, superintendent of telegraphs to the South-eastern Railway, followed in the same course, by a



SECTION OF SUBMARINE TELEGRAPH WIRE.

The four wires distinguished by the letter A in the engraving, are insulated by the Gutta Percha B, and wrapped with spun-yarn, saturated with tar, which protects them from the galvanized wires D. This twisted galvanized wire has been recently added to protect the Gutta Percha, which was at first used alone.

series of experiments in this country, and even then seems to have conceived the idea of direct telegraphic communication between England and France, which he must feel proud to know is not now an utopian dream but a *fait accompli.*

In the history of scientific discovery it is both curious and instructive to note the simple process which often, step by step, leads on to the ultimate fact, and the gradual and continuously increasing uses of electricity is a remarkable instance of this kind. The experiments conducted in connection with the South-eastern Railway were, in view of the whole question of submarine communication, like the breath of a fine morning and the rays of a warm sun, inviting the opening petals of a summer flower which had never yet scented the air with its fragrance, or cheered the world with its beauty. Friends living hundreds and perhaps thousands of miles distant, had by means of autograph and printed communication somewhat filled up the gulf of separation ; but coaches, and railways, and ships, require time to convey their silent messengers of recognition—of friendship and love, though they had been spurred on in their course by steam ; but electricity was the powerful and mysterious agent which was destined to bring far-off continents within speaking distance, by means of threads of wire, coated with the sap of an insignificant and almost unknown tree.

Mr. Walker it appears had in successful use this gutta percha coated wire in the several wet tunnels of his railway, which extends to the sea-coast ; and there being also a harbour under the same direction, and ships equally accessible, he sought and obtained permission of the directors to make a submarine experiment, which was performed on the 10th January, 1849.

"On the evening of the 9th," he writes, "I for the last time tested the continuity of the wire, by placing the drum—upon which it had previously been wound as it had been prepared for use—on the sand, and connecting the coated wire with the wire that led from London, and then with the ripple at our feet, and by the glare of lamps, around a motley and wondering group of fishermen, seamen, revenue officers, and others, we proved the circuit was good, by holding converse with the clerks in London.

"It had previously been arranged that the telegraph business of this day should be on one wire (No. 2), leaving No. 1 at liberty for these experiments. The Folkstone end of the wire was joined to the submerged wire, the other end of which was also now connected with a single needle instrument on deck.

and the circuit was completed by an earth-plate dropped overboard.

"These operations were done in presence of our guests, who were now on board; there was no *rehearsal*, and the wire was meanwhile buffetted by the waves against the pier All being ready, I took the handle of the instrument and made the letter, L—the call for London; the acknowledgment of the call was instantaneous; and at forty-nine minutes past noon the first telegraph despatch passed beneath the British Channel, in direct course to London. That despatch was, 'Mr. Walker to Chairman,—I am on board the *Princess Clementine:* I am successful.' Immediately upon this a correspondence was kept up with London. Communications were interchanged with other stations on the main line; and after several hours' immersion the wire was drawn up safe and sound. This same wire is now in its place in Merstham tunnel, and has been the channel through which all our important despatches have since reached London."

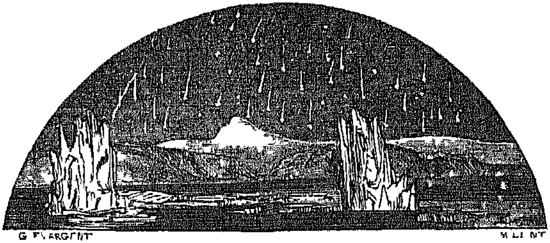
But Mr. Jacob Brett was now before the Government and the public, having patented a "Subterranean and Oceanic Electric Printing Telegraph," which was said to be adapted for unlimited communication. Even in July 1845, Mr. Brett had proposed to the Government to connect the metropolis with the various "Colonial and Channel Islands." The extraordinary power of this Printing Telegraph will appear when we state that the machine may be made to *print* from three hundred to three thousand letters per minute. "The actual distance proved to act by it in one continuous line has been two hundred and thirty, and three hundred and forty miles apart, at the rate of one hundred letters per minute" Among its earliest exploits was the following:—The Message of the Governor of the Legislature of New York, delivered at Albany on the 7th of January, and consisting of two columns and a half of solid nonpariel, was published in the city of New York two hours after its delivery, having been transmitted so many miles sentence by sentence.

Mr. Brett now sought to *establish* a telegraphic communication between England and France, and on the 31st of Dec. 1849, obtained the consent of the President and Minister of the Interior of the French Government for that purpose, the patentees on their part guaranteeing that this Submarine Telegraph should, by the aid of a single wire, and of two persons, one stationed in France and the other in England, be capable of printing, in clear Roman type on paper, one hundred messages of fifteen words each, including addresses and signatures, ready for delivery, in one hundred consecutive minutes.

The arrangements being completed, this great problem was at last to be solved; and the points selected were the beach at Dover, on the English, and Cape Grenez, on the French coast. A week previous to the experiment, the "Goliah" steam-vessel arrived at Dover, having on board thirty miles of the submarine wire, which was, as in the case previously mentioned, coiled upon an immense reel or drum, fifteen feet by seven, and was coated with gutta percha about nine-sixteenths of an inch in diameter, and weighed five tons. About four hundred feet was encased in lead tubing, for better protection from chafing near the shore.

On Wednesday, the 28th of August, 1851, the "Goliah" was moored off the Admiralty Refuge Pier, being provisioned for the day, and having on board a crew of thirty men, besides Mr. Brett; Mr. J. C. Wollaston, C.E.; Mr. F. Edwards, and other scientific gentlemen. There was an anxious crowd assembled to witness the departure of the steamer with its cargo of noble-minded men engaged in an effort to link together, with a chain of fire, two of the greatest nations of the civilized world. About half-past ten o'clock, the end of the wire on board was securely fastened to the end of that from the shore, and the operation of "paying" out the thirty miles of wire commenced, which was run out at the rate of about three miles an hour: every sixteenth of a mile during the process of paying out, having riveted to it leaden clumps or weights, of from fourteen to twenty-four pounds. During the progress of the work, interesting communications were kept up between the ship and the shore, and by skilful manipulation, every difficulty arising from the peculiar physical configuration of the track over which the wire had to pass was surmounted, and in the evening the gentlemen occupying the opposite shores, which are separated by a distance of twenty-one miles, could converse together, though by different means, as easily as two friends seated at the same table. Thus amid the most cheering prognostications of future amity and brotherhood, was practically developed the most wondrous of modern inventions; and those countries which aforetime had met in bloody war, now vied with each other in seeking the occasion and the means of friendly intercourse, which it will be the wish and the earnest prayer of every good man may be continued in uninterrupted fruition "until the sun himself grows dim with age, and Nature sinks in years."

SHOOTING STARS.



The phenomenon of a shooting star is always classed in the catalogue of the wonderful, no less by the ordinary observer, than by the man of science. To the first it appears to be a partial subversion of the laws of nature; to the second, an index to laws and circumstances yet to be fully understood. In the clear cloudless nights of autumn it is common to see a kind of star shooting along with great rapidity, and leaving behind it a kind of light which quickly disappears, and leaves the heaven as sombre as before. This shooting star, or as it is more vulgarly termed, the fire-ball, is by no means to be regarded as a star, but as a body quite separate and distinct from anything of stellar constitution. In ancient times these brilliant apparitions were regarded as prognostications of the weather, and were invested by superstition with the most imaginary and terrible of powers. To account for their appearance has long been an object of noble ambition with philosophers, and the most opposite theories have been framed to explain them. Lavoisier and Volta both imagined that they were the result of the combustion of hydrogen gas in the upper parts of the atmosphere; and Halley, the great astronomer, ventured to suggest a similar mode of explanation. The first attempt to investigate their nature by the aid of correct scientific principles was made by Professors Brandes and Benzenberg, in the year 1798. They stationed themselves nine miles apart from each other on appointed nights, and observed twenty-two meteors, and by a comparison of observations, reduced by the rules of trigonometrical measurement, proved that seven of these were under forty-five miles from the earth, nine were between forty-five and ninety miles, five above ninety miles, and one above one hundred and forty. Hence it was evident that these "meteor lights" could claim no kindred with the stars; the nearest of which is many millions of miles removed from our planet. The fact also, that by an inspection of the heavens after the appearance of one of these bodies, the stars are found to be arranged exactly as before; not one, however minute, being missing, aids in proving that shooting stars or meteors are closely connected with the earth itself, and occupy a region but a few miles from its surface.

In 1718, one of these meteors appeared, and was witnessed all over England. Its brightness was so vivid that Sir Hans Sloane, who observed it, was several times obliged to turn away his eyes from it; and while it continued in the heavens, the light of it was so intense that the moon and stars disappeared. It was computed to have passed over three hundred geographical miles in a minute, at a height of sixty miles from the surface. The sound of an explosion was heard in Cornwall, and it may be conjectured that the meteor fell into the sea off that coast.

Of late years the fact has been established of the fall of heavy meteorial bodies in connection with these meteoric lights, and to these bodies the term aërolites is applied, signifying "a stone from the air." Showers of stones are mentioned by Livy and Pliny, and a shower of quicksilver is mentioned by Dionysius. In 1510, a shower of twelve hundred stones descended in Italy, at a place near Padua; and one of the stones weighed as much as one hundred and twenty pounds. In 1790, an extensive shower of stones fell in Agen, on the Garonne; and in 1794, a smaller shower of a similar nature occurred in Tuscany. In the year 1492, a most remarkable event of the kind occurred at Ensisheim, on the Rhine, in the fall of a stone weighing two hundred and sixty pounds, which was accompanied by a loud clap of thunder and a continued noise. The stone was seen by a child to strike on a field, where it sunk into the earth to a depth of a man's stature, and was removed from the hole which the force of descent had caused, and placed in the church of Ensisheim, where, after being removed during the French Revolution, it was afterwards replaced, and is still to be seen. Several specimens of rock which have fallen in this way are to be seen in the Geological Gallery of the British Museum; one piece of great size, chiefly composed of magnetic iron, merits especial attention.

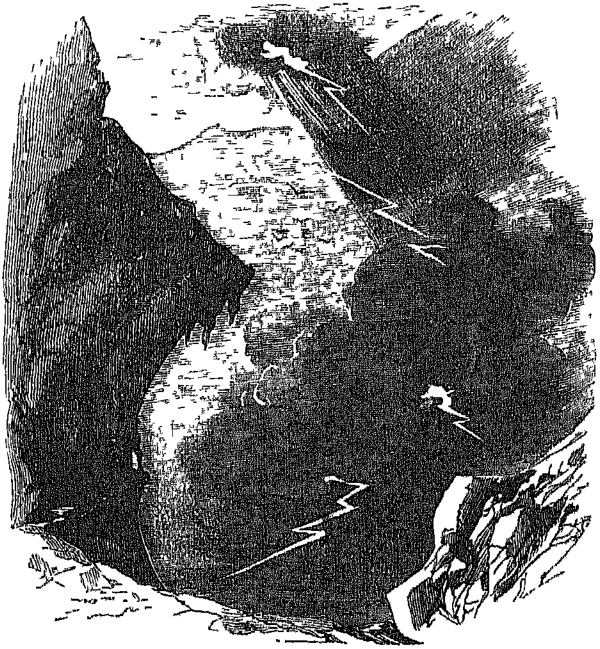
Shooting stars being thus identified with the fall of these bodies, though the descent of the fragment does not happen on every occasion when these arrowy lights are seen, it becomes important to ascertain in what way these bodies are produced; or, rather, why it happens that solid stones and blocks of metal should descend from the atmosphere? The occurrence of immense showers of these meteoric lights, and in such rapidity and brilliancy as to surpass the finest exhibitions of fireworks, throws some further light upon the subject, and suggests a mode of explanation at once simple and in the highest degree probable. Humboldt, when travelling in South America, witnessed a most extraordinary scene of shooting meteors, which happened on the morning of the 13th of November, 1799, and consisted of thousands of falling stars rapidly succeeding each other during a space of four hours. Their direction was regular from north to south. From the beginning to the end of the shower there was not a space equal to three diameters of the moon which was not filled every instant with arrowy darts of flame; and every meteor left behind it a streak of vivid light which lasted seven or eight seconds. A change in the weather occurred and continued during three days after this phenomenon; and accounts, which were afterwards gathered relative to it, proved that the display of meteors was seen over an extent of a thousand miles. In Canada, in 1814 and 1819, similar showers were noticed; and in the autumn of 1818, in the North Sea, when, in the language of one of the observers, the surrounding atmosphere seemed enveloped in one expansive ocean of fire, exhibiting the appearance of another Moscow in flames. Another exhibition upon a great scale occurred on the 13th November, 1831, and was seen off the coasts of Spain and in the Ohio country. This was followed by another on the same day in the succeeding year, and this again by another, which was the grandest ever witnessed, on the same day, in the year 1833. From Central Mexico to the North American lakes, and through the West Indies and over a great part of the Atlantic, this brilliant shower of natural rockets was visible; one star of large size being observed for some time hovering over the Falls of Niagara, emitting streams of light. This strange spectacle commenced a little before midnight, and reached its height between four and six the following morning. The remarkable circumstance is testified by every writer, that all the luminous bodies, without a single exception, moved in lines, which converged in one and the same point of the heavens, a little to the south of the zenith. Though none of them started from this point, but their direction, to whatever part of the horizon it might be, when traced backwards, led to a common focus. According to Professor Olmstead, the shower could not have been less than two thousand two hundred and thirty-eight miles from the surface of the earth.

The attention of astronomers having been called to these exhibitions, simultaneous observations were instituted, and it was found that the 13th of November was usually marked by the appearance of these showers, and that they were truly periodical, and recurring at that time. Professor Olmstead and M. Arago, both concur in the belief that a number of small bodies are continually revolving around the sun, in an orbit which at one part of its course cuts the orbit of the earth; and that the earth in consequence meets these planetary fragments in the month of November every year. The brilliant appearance which they assume, doubtless arises from their coming in contact with the outer portion of our atmosphere, and becoming ignited by friction with it, unless indeed they possess a luminosity of their own. Though great obscurity rests upon the subject, the fact may be deemed certain that, independently of the great planets and satellites of the system, there are vast numbers of bodies circulating round the sun, both singly and in groups, and probably a great nebulous cluster which the earth meets periodically, and which causes the meteoric showers already described. Whether these are the scattered remnants of an exploded world, or blocks ejected from volcanos in the moon, and which have got beyond the attraction of the world from which they emanated, or are original accumulations of matter, yet to be accumulated and gathered into complete orbits, are all points beyond the human understanding; but that these lights do appear at all seasons is certain, and that they are caused by the rapid passage of actual masses of matter through the exterior portions of the earth's surface is extremely probable, both from the investigations of philosophers and the deductions of common sense.

THUNDER STORMS.

A STORM IN THE ALPS.

STORMS and Avalanches are peculiar to the Alps. Mr. Auldjo gives a description of one of these phenomena. It manifested itself while he and his party were upon the glacier, on their route from the Mulet rocks to the foot of the Aiguille du Midi. They had several presages of the storm before, but it recommenced with great violence at the moment when the party had



lost their way. The snow and hail fell fast, and obliterated all traces of their route. The guides went forward to explore, and fears were entertained that they would have to stay in the inhospitable regions all night. Tremendous gusts of wind now burst upon them; the storm increased every moment; and compelled them to seek some place in the glacier in which they could obtain shelter. "Following the footmarks of the guides who had gone forward," says Mr. Auldjo, "we succeeded in finding a recess formed by a projection of a part of the glacier, over a narrow ledge in the side of a deep crevice. Along this we moved with great care, and had just space to stand in a bending posture, and in a row. I was wet through, and suffered excruciating torture from the cold, and the position I was obliged to remain in.

"The storm raged with most awful fury; the gusts of wind, the pelting showers of hail, accompanied by the most vivid lightning and peals of thunder, alternating with a perfect calm, were enough to appal the bravest of the party. We waited some time in this situation, when, in one of those moments of calm, was heard the loud halloo of one of the exploring guides, who was returning to us, and called to us to advance, for they had found the angle which we had so much difficulty in climbing up the day before. We soon joined him and his companion, who conducted us to it. Nearly deprived of the use of my limbs, from the excessive cold and wet state of my apparel, I could scarcely walk; my fingers were nearly frozen, and my hands so stiffened and senseless that I could not hold my baton or keep myself from falling. Supported by one guide (the bank on which we were proceeding would admit of no more than two abreast), I moved slowly forward, and in this state arrived at the angle. The only change which appeared to have taken place was on the neck or tongue below the cliff. The day before it touched, or slightly rested on the wall, but the end of it had fallen in, so that there was some difficulty in getting to it from the last step in the wall. One or two of the guides betrayed evident signs of fear, for the black thick clouds in which we were involved caused a gloominess approaching to darkness, and which was actually produced in the gulf or fissure. The lightning flashed every moment, immediately followed, or rather accompanied by claps of thunder, showing its proximity to us, and the loud peal rolling among the mountains and glaciers reverberated with most terrific grandeur, shaking the broken masses of the latter in such a manner that we dreaded, at every explosion, to be hurled into the deep crevice, or crushed by the fall of some part of the glacier.

"This was not a time or situation to remain in longer than was necessary for cutting steps in the wall, instead of those which had been injured; nor was it a position in which any attempt could be made to restore life to my hands, or animation to my body. I had now nearly lost all feeling, from the effects of the cold; and being incapable of making any exertion, I was lowered down to the guides, who were already on the edge beneath the wall. At the very moment I was rocking in the air, a flash of lightning penetrated into the abyss, and showed all the horrors of my situation; while the crash of the thunder seemed to tear the glacier down upon me. I was drawn on to the neck of ice, and sat down until the other guides had descended. The hearts of two or three failed, and they declared that we must all perish; the others, although conscious of our awfully dangerous position, endeavoured to raise the courage and keep up the spirits of the depressed. All suffered dreadfully from the cold; but, with a solicitude for which I shall ever be deeply grateful, they still attended to me in the kindest manner. They desired me to stand up, and forming a circle, in the centre of which I stood, closed round me. In a few minutes the warmth of their bodies extended itself to mine, and I felt much relieved; they then took off their coats, covering me with them, and each in turn put my hands into his bosom, while another lay on my feet. In ten minutes, I was in a state to proceed; and we then moved down the neck of ice."

TORNADO IN THE BAHAMAS.

We will now, with the aid of those who witnessed it, give a description of a tornado which swept over the Bahamas about two years since. The Bahamas form a very extended and numerous group of West India Islands, and stretch in a north-westerly chain from the north side of St. Domingo to the coast of East Florida. Though the climate of these islands is temperate and healthy, north-east and sometimes north-west winds blow in strong gales; thunderstorms are violent and frequent, and the shocks of earthquakes are sometimes felt. Sometimes the islands are the prey of hurricanes and tornados, the relative strength of which is thus classified by meteorologists. A *squall* or sudden gust of wind is common in many places, and when its impetuosity is sufficient to bear along trees and buildings, it is called a *hurricane;* such winds have frequently a whirling motion, and are accompanied with torrents of rain or hail, and even thunder, these are called *tornados.*

One of the most devastating of these atmospheric phenomena visited those parts of the Bahamas called Grant's Town, and Baines Town, on the 30th of March, 1850, and raged for a few minutes with a violence unknown even to those who for forty years were residents in the West Indies. The circumstances of this awful visitation are detailed in a pamphlet, written by two gentlemen who witnessed the phenomenon—the Rev. John Woodcock, and Captain Nelson. On the day of the tornado, the Captain was seated in Nausau reading, *when it grew rapidly dark!* Immediately before and after this, were those violent rains, commonly known as "Downright Tropicals," thunder and lightning, loud, vivid, and frequent. The Captain immediately made his way to

Grant's Town and Baines Town, about a mile distant. The way there was blocked up with the wrecks of dwellings, masses of palmetto, branches and trunks of the cocoa-nut palm-trees. These and scores of other things were scattered in awful confusion, "all possible aid was rendered to the sufferers; the surgeon, the minister, the governor, the soldier, the member of the House of Assembly, were alike active in rescuing the survivors from fallen houses."

Mr. Woodcock says "Saturday, the 30th of March, was ushered in with rain, and continued with storm, thunder and *lightning, and every indication of great electrical disturbance*; although men crept under shelter, and shut their doors and windows, no one apprehended any unusual convulsion of the elements." But the sky grew blacker and blacker, the rain fell heavier and heavier, there was a loud roar of warring elements, *and suddenly* a solemn stillness—a lull, as if the tempest were gathering its fury to burst with destruction on all beneath its sway. Rapid, short, and deafening claps of thunder, preceded by vivid forked lightning, occurred at intervals. At last, a low roaring noise, somewhat resembling the rush of many wheels, arose towards the south-west of the town and suburbs of Nassau. In that direction lie the settlements we have alluded to, which contain a population of about two thousand five hundred souls. The houses of these people are built of native palm branches, intertwined and consolidated with plaster, and are nearly all thatched with the leaves of the palmetto, or fan-palm, which grows in great abundance throughout the Bahamas. "At the south-western corner of these settlements the storm descended in the form of a tornado, and proceeded with terrible velocity, in a slightly curved line to the north-east, its path rarely exceeding twenty to one hundred yards in width. Whatever stood in this line was destroyed or desolated; the fragile houses of the poor Africans were caught by the whirlwind, dashed to pieces, the fragments scattered over the island and into the sea; stone walls and more substantial dwellings were overturned and prostrated, and the sky seemed crowded for the while with flying beams, roofs, furniture, and clothes. The rotatory character of the tornado, by whirling round and round these terrible missiles, increased the destruction and decreased the power of resistance. In vain the lofty cocoa-nut palms struck their roots into the rock; they were twisted asunder like a tender herb, and hurled upon the earth, monuments of the power of the unrestrained tempest. The fruit gardens—upon the produce of which the poor settlers so much depend—were utterly desolated, the avocarto pears, the shaddocks, the oranges, lemons, limes, &c., were stripped by the whirling missiles of their very barks, if indeed they remained at all; even the herbs were torn from the earth to complete the ruin."

The raging of the storm, the cries of the wounded, the excited, the terrified,—the hurrying to and from the confused crowd of the homeless, the curious, and the benevolent,—and the bleeding forms of the dead laid upon some rude stretcher and borne aloft on the shoulders of their neighbours; such were the components of that wild and horrible scene, which must, without doubt, leave an indellible impression on the minds of those who witnessed it.

The late Mr. Pringle has vividly described, in a poem, the nature and effects of a Tornado. It begins thus:—

Dost thou love to see the rushing
  Of the tempest in its might?
Dost thou joy to see the gushing
  Of the torrent at its height?

Hasten forth while lurid gloaming,
  Waneth into wilder night,
O'er the troubled ocean foaming,
  With a strange phosphoric light.

HURRICANES.

The most dreadful storms which occur in the atmosphere, are the hurricanes by which the Antilles and Mascarenes are so often ravaged. The fury of these appalling phenomena is beyond conception. It is as though all the elements were being hurriedly forced by some overwhelming power into their original chaotic confusion. The air sweeps along with a tremendous velocity, accompanied with thunder, lightning, rain, and hail; and carrying away every object it meets within its devastating course, frequently leaves whole districts bare and desolate. Mr. Stewart, in his *View of the Past and Present State of Jamaica*, gives a description of these storms, which we quote:—" A hurricane is usually preceded by awful and certain prognostics. An unusual calm prevails; not a breath of wind is felt, the atmosphere is close and sultry, the clouds wild, broken, and perpetually and rapidly shifting. At length a deep and portentous gloom gradually settles and overspreads the hemisphere; the sun is enveloped in darkness; a deep, hollow, murmuring sound is indistinctly heard like the roaring of a distant cataract, or the howling of winds through remote woods; rapid and transient gusts of wind and rain speedily succeed; various birds of passage are seen driving hastily along the sky, or are thrown down by the violence of these gusts. Even the cattle grazing in the fields, as if instinctively aware of the approaching danger, withdraw to the thickets for shelter. The blasts soon become more impetuous; at one moment they rage with inconceivable fury, and in the ensuing instant seem as if suddenly to expire. In a few hours the hurricane reaches the acme of its violence; when all the winds of heaven, and from every point of the compass, winged with destruction, seem let loose from their caverns. The largest trees are thrown prostrate, or shattered or stripped of their foliage; the provision-grounds are laid waste; the sugar-canes levelled to the earth, and in the more exposed situations, torn up by the roots, and wafted about like chaff. Many of the dwellings are blown down, or unroofed, and their inhabitants either buried in the ruins or driven forth to perish unsheltered. Nothing can be more appalling than the wild howling and threatening violence of a hurricane during the night, when the vivid and quickly-succeeding gleams of lightning, darting athwart the heavens, make 'darkness visible,' and heighten the horror of the scene." Fortunately, however, the duration of a hurricane is usually short, and their sphere of action limited. They are only known in tropical regions, and only occur at intervals between the months of August and October.

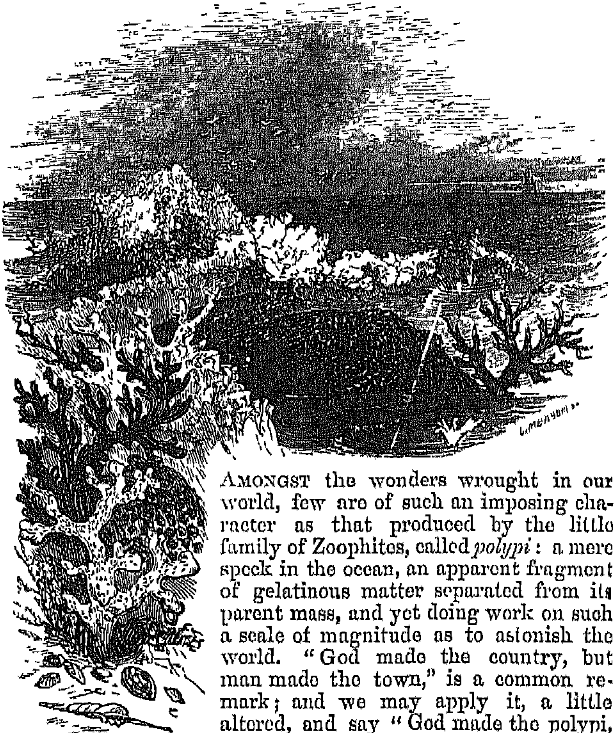
* * * * * *

Hark! the long unopened fountains
  Of the clouds have burst at last,
And the echoes of the mountains
  Lift their wailing voices fast.

Now a thousand rills are pouring
  Their far sounding waterfalls;
And the wrathful stream is roaring
  High above its rocky walls.

Now the forest trees are shaking,
  Like bulrushes in the gale;
And the folded flocks are quaking
  'Neath the pelting of the hail.

WONDERFUL ISLAND BUILDERS.



Amongst the wonders wrought in our world, few are of such an imposing character as that produced by the little family of Zoophites, called *polypi*: a mere speck in the ocean, an apparent fragment of gelatinous matter separated from its parent mass, and yet doing work on such a scale of magnitude as to astonish the world. "God made the country, but man made the town," is a common remark; and we may apply it, a little altered, and say "God made the polypi, but the polypi made the islands."

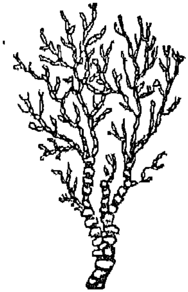
Our conjectural hypothesis very often supply the place of argument in the developed formation of the earth, but here are creatures the descendants of a long race of the same order, still busy either in laying the foundation of new islands or in enlarging those they have already built.

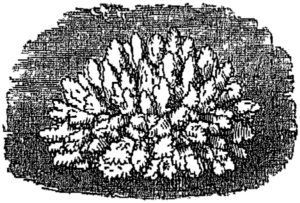
These polypi build long and pretty branches, which at first yield and wave to and fro in the waters so symmetrically and elegantly as to attract the attention of all, but the creatures which have given form and permanency to them are overlooked. Many a time have these branches been torn up, and the little clinging creature rudely and unscrupulously removed, and regarded only as foreign and dead matter, until, by the aid of the *Chevalier Prichard Plöst's* achromatic engines we were enabled to discover a living body, arms that grasp and secure food, limbs muscularly constructed, so as to bear all the material of which to construct their homes and build their dwellings.

The attention of Zoologists have been called as much to the creature as to their delicate work, and amongst them Lemarc has fixed their character. He calls them animals with gelatinous contractile bodies; says they have an alimentary canal, with a single opening surrounded by *ciliæ* or *tentacula* (arms), reproduction by gammæ, internal or external organs of sense, respiration or fecundation none, often associated into compound existence. Now, if to these definitions we add the notion of extraordinary tenacity of life, manifested by the survival and multiplication of hydræ under the knife, the surprising fact of the external surface taking up the function of digestion when the animal was turned inside out, and the germiparism (or the duplicating of itself), as observed by Ellis and others, the employment of the tentaculæ or cilia round the mouth, we have a world of wonders in this little creature incomparably surpassing all other created wonders, whether we rise to the magnitude of the mammoth, elephant, or descend to the most minute.

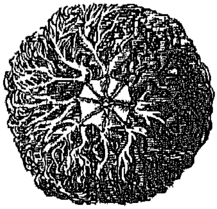
These creatures constitute a very large family, varying in some minute particulars, but all similarly employed. They have the appearance of being the most minute scavengers of the ocean, catching at particles of putrescent matter which are either too minute for larger creatures, or dispossessed by their semi-fluidity of any commendable nutrition, and so held to be unworthy grasping. Transforming this into a sort of glutinous plaster, they fashion and form their cells of interminable character. These creatures are transient and short-lived, and invariably die *within doors*, for, entering the little cavity so lately constructed, it serves them for a tomb as well as a home, and this taking place in such multiplied numbers, and under such multiform conditions, we have joints and branches growing out of every particular stem.

The coral of these creatures is not all branch-like, but in some instances, as in Ellis's *Eschara foliacea*, which was found amongst the Silurian rocks, consisted of a flat plate-like layer adhering to the rock, perforated irregularly, and made into cells without reference to order, having a depressed part





here and an elevated part there, it appeared calcareous, brittle, friable, and porous, but leaf-like on the whole.



Another form found is that of foliage, and is described by Lemare as *Adeona folifera*, which consisted of a series of convoluted expansions, radiating from the point of a rock, to which it was attached. This is a very beautiful specimen of coral as to form, but by no means common: the cells are so minute and multiplied as almost to defy calculation.

In the geology of Yorkshire a rare specimen has been found of coral formation, called *Retepora cellulosa*. This differs in all respects from former contributions: the cells and openings upon this pretty formed plant-like coral stem are each as near like its fellow as possible: the openings are from the outer or exposed side, and these are made upon the surface of the plates, or leaves of limestone coral.

We should like to lay before our readers all that Buckland, Lemare, and Ellis have said, and give them the varieties to which these learned men have devoted attention; but we pass on to notice the works of this wonderful little animal, which are to be found in all parts of the world. The coral formations of the Pacific are perhaps the most complete, and while they are accessible to every scrupulous inquirer, they are also amongst the wonders of modern discovery. Flourishing as they do under a tropical sun, they become paridisaical for their wonders in vegetable production. Tall trees of bread-fruit palms from the East, and cocoa-nut, are surprisingly upreared, and here men and their families have a permanent and an abiding home. *And yet at a date not greatly anterior* to the formation of the Roman empire, must these little creatures have commenced their labours. We are often told that this mysterious animal cannot live in deep water, and that therefore they are not the builders of these island-homes for the red man in the Pacific. True, but as volcanic action is common in the Pacific Ocean, upheaved subterranean matter may at once become the base, and the mighty workshop of insect architecture go on until the superstructure is so *far* reared that floating matter grounds upon it, and, finally, all that can be needed to make green fields and fruitful valleys finish the work.

Submarine mountains must be at the bottom, craggy and uneven, and to these our little fraternity make fast, stretching out their tentacula and catching hold of their food and material and turning both to account. We cannot always admit of assertions that these creatures cannot live at great depths. When evidence can be produced to show that in soundings taken by Captain Beachy, he found coral *forming at a depth* of one hundred and eighty feet: and Mr. Bakewell also asserts, "that some species of coral have been brought up from soundings in one hundred fathoms of water." But be this as it may, these islands are of coral formation. Some are mixed with volcanic matter and others have a variety of marine products, but each proportion combines so as to give *solidity and duration to the work.*

Coral often rises very much above the surface of the sea, but the island itself, or that portion of it, must have undergone the change of position by the base being volcanically upheaved; or where the whole is above the water, then the water must have subsided, as out of the water these creatures could not work; they are aquatic or marine animals, and live to work, as well as work to live, and God has provided them an element.

Limestone coral reefs are so common in the Pacific Ocean that Flinders calls it the corallian sea; large masses of zoophite industry combine with shells of every description in the formation of these islands, and believing as we do in the fluidity of oceanic matter, we regard it, wherever it settles down, as so much residuum prepared to give form to a rock, and, in combination with the labour of these minute and imperfect creatures, we have what is the limestone coral formation.

The Polynesian Archipelago are amongst the wonders of

Nature; their formation must be regarded, as we have said above, as at no distant period of the world's history—they are not among the "Everlasting Hills" of ancient story. The men living upon them are amongst a race to be traced to the Asiatic Continent, the trees and shrubs but transplanted, and the wild creatures but the arrivals of chance. Some have floated there roughly, on the very material which was forcibly torn away from its primitive lodging-place, and others have been landed thereon by navigators touching at the islands. There can be no doubt but these islands have either a volcanic base or are a mountainous elevation from the depths, and to these myriads of minute polypi come; and as the sea abounds as we have already asserted with carbonate of lime, this is seized by these little creatures, and with their own gluten formed into a paste, and tree after tree of coraline formation grows, branch succeeds branch, stretching out on every side, until all the floating mass of weed and submerged grass and earth intertwine and cling, impeding the progress of all the moving mass below. To this, submarine weeds in their living condition cling—seeds of other sorts come, and fertility and growth add to the labours of the zoophites which industriously rear their work until it reaches the surface; then comes the finishing touches of gravitation, and storms and hurricanes terminate what these creatures have begun.

Coral formations are evidences of the extraordinary power entrusted to a minute creature, who, by its multiplicity in number and continuous working, changes the character of our earth's surface. Making a mountain where rolled an ocean, and stretching out a reef of rocks where once the gallant ship found a high-way. On the south-west coast of Malabar we have a low reef of rocks or islets stretching away four hundred and eighty miles in length. Another reef of rocks unbroken in their extent is found on the east coast of New Holland of three hundred and fifty miles in length. Between thence and New Guinea is another coral formation, upwards of seven hundred miles long. Others in the same region vary from six hundred to islands of as many miles.

Captain Basil Hall gives an interesting account of the formation of a coral reef which he saw near the island of Loo Choo. He says, "when the tide has left the rock for some time dry, it appears to be a compact mass, exceedingly hard and rugged; but as the water rises, and the waves begin to wash over it, the polypi protrude themselves from holes which were before invisible. These animals are of great variety of shape and size, and in such prodigious numbers, that in a short time the whole surface of the rock seems to be alive and in motion. The most common form is that of a star, with arms or tentacula, which are moved about with a rapid motion in all directions, probably to catch food. Others are so sluggish that they may be mistaken for pieces of the rock, and are generally of a dark colour.

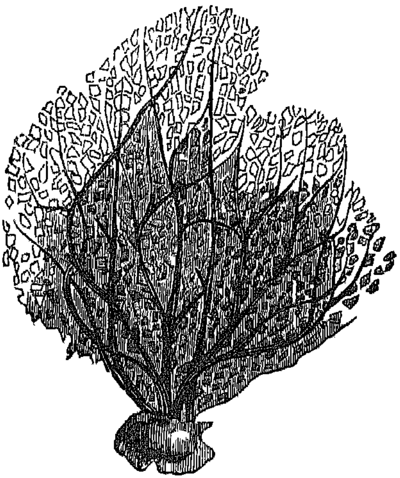
When the coral is broken about high-water mark it is a solid hard stone; but if any part be detached, where the tide reaches every day, it is found to be full of polypi of different lengths and colours, some being as fine as a thread of a bright yellow, and sometimes of a blue colour. The growth of coral appears to cease when the worm is no longer exposed to the washings of the sea, thus a reef rises in form of a cauliflower till the top has gained the level of the highest tide, above which the animalculæ have no power to advance, and the reef of course has no power to extend upwards.

Microscopic inquiries and investigations have disclosed many features in reference to these creatures that are both new and interesting. These creatures are found to form a cellular hole, to live in and work from, and each time the tide leaves, to retire into; and when its short life terminates, then another takes up the fragmental surface, seals up his dead predecessor, and builds for himself a new habitation upon the very tomb of him so lately deceased. The tubular form of the coral in all its positions assures us that these polypi are the fairies of the deep, who make a forest vast and impenetrable, and continue their work with such persevering tenacity that, if we can imagine their multiplication indefinite, they would ultimately displace the water, and add to our facilities for connecting the whole world by bridges.

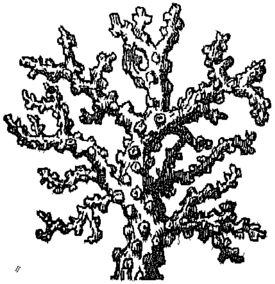
Coral consists of three varieties, red, white, and black, the first of these is the coral of commerce, *corallium rubrum.* This is found chiefly in the Mediterranean sea, and is susceptible of the highest polish; its appearance is very like ivory dyed red, and polished by the overlaying of varnish. Of this is constructed the ornamental work which, when mounted in gold, covers the neck of the fair, fills the ear in long dangling drops; and of this is formed for the infant its coral and bells to amuse and help it through its period of dentition. The polypi itself seems to possess a sort of duplicature of colouring matter, outside it is blue, and inside a sort of vermillion, which stains the conglomerated tubular house in which it lives, and finally leaves it more or less red—the clearer the colour the higher its value. Fishing for coral goes on variously, but very few have adopted the best method to obtain it from its ocean bed. A party of boatmen go off with a rope-net, wooden beams, and cordage, which when payed out is many fathoms deep; this in time is made fast and brings the boat up, and the crew prepare for the haul. Another method is, the improved wire-net, such as has been used in the north seas, to liberate from the depths those of the finny tribes who suffer flexible nets to pass over them. With these considerable success has crowned the enterprise. This is the red coral which is an article of commerce, bearing its proportion of value to some of the precious stones, and is sold like them by the carat,—a delicate weight which ruder material can have no comparison with.

Coral is found amidst seas with currents as wild and turbid as the Bay of Biscay, but most of those large formations which are first rudimentary and finally complete islands, are deposits in the very midst of the ocean, stretching a far in long strata below, warning the mariner to give it plenty of sea room; these are in almost all instances white or limestone coral. The black coral is exceedingly jet-like in many instances, and where found clear and bright will fetch its value in the market, surpassing jet. Though the last two are merely procured as marine curiosities, and are rarely used for any other purposes, yet Mr. Williams, the missionary, found, by burning the coral rock of the Pacific, he could procure a purely white lime, which, reducing to a colouring matter in a semi-fluid condition, he whitewashed his cottage with, which so astonished the dark-coloured inhabitants of the island, that they hunted about and found the whitewash, pot, and brush; and trying its effects first upon an arm then upon a leg, the two who found it agreed to whitewash each other; then, being detected by their wives, they would be whitewashed too; then came the children, after them the pigs, and dogs, and finally a quarrel who should be the next, when the good men appeared and ended all by assuring them it was a preparation only to improve their cottages, and that he would make enough for them all; but what was their surprise when they found the missionary making a fire out of stone, and colour out of the lime.

The forms of coraline product are the Gorgona, or Venus's Fan, a common but beautiful net-work dotted all over, which, when seen through the microscope, each dot is perceived to be a home and contains a living creature. Another form is called the Isis, which is sponge-like, and is impressible; it is tough, and very much like a bulrush in its woolly



appearance. Then there are the Madrepores, and exceedingly minute are the cells of the creature forming this field of labour. All substances lost or submerged in the deep, are covered over with coraline formation, whether it be a plank, a ship's mast, or a piece of metal, and hence we can understand what myriads of coral insects live, move, and work below. In the seas washing the shores of New South Wales, the coral formation is most rapid, and equally extensive; the Red Sea and the Molucca islands are equally abundant in their products; and, but for the many causes displacing the creatures who work, and the violent and sudden death of many by fragmentary rocks being torn up by the force of the seas; the very bed of the ocean would be changed, and submarine mountains endanger our maritime progress—and all this by an insect which is so insignificant as not to admit of any well-defined form, and so small as to hide



itself in a space very little larger than to admit of a pin. Work on little creature, do your Maker's bidding, and when the last fires shall consume the earth, and man shall be called to his account—

> "Then he shall see, and hear, and know,
> All that was indefinite, and hard below."

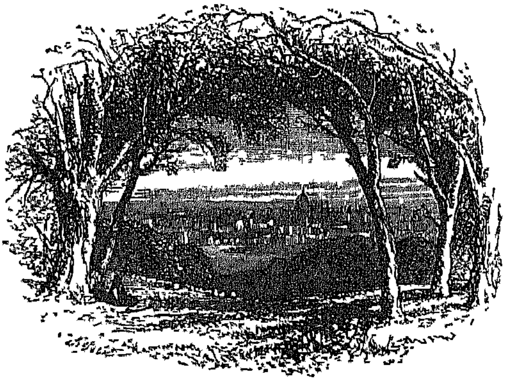
THE GREAT METROPOLIS.

Of all the wonders of the world we moderns are accustomed to regard London as the greatest. It has become our ideal of the power, wealth and magnificence of a great nation. There is, however, perhaps, but one aspect in which this city can be regarded as pre-eminently wonderful. Numerous cities of the past, which, as far as they are known to history, have been described in these pages,—for of many we have no records, save the silent ones of their desolate ruins—are, when considered simply as the habitations of men, certainly much more remarkable. In science, art, architectural splendour, and adaptation to wants and conveniences of their inhabitants, there are very many cities, both of the past and the present, which may proudly vie with our metropolis; but as a dense congregated mass of human life, London is unique in its immensity. It is a whole nation crowded and huddled together in a mighty wilderness of streets; No idea can be formed of its magnitude in this respect, without witnessing the great tide of human beings which daily pours through its veins. Its two millions of population; its seven hundred million square feet of territory; its two hundred and sixty thousand houses, leave but a vague and very imperfect impression on the mind, when presented in the form of figures; but when we consider that it contains almost as many inhabitants as the whole of Scotland, that it would take four New Yorks, or sixty cities as large as Exeter, to equal it in extent and population, we can form some conception of the size of this mighty wilderness.

Within a circumference, says "*London as it is to-day*," the radius of which does not exceed five miles, there are never fewer than two millions of human beings; and if the great bell of St. Paul's were swung to the full pitch of its tocsin sound, more ears would hear it than could hear the loudest roar of Etna and Vesuvius. If we take our station in the ball or upper gallery of that great edifice, the wide horizon, crowded as it is with men and their dwellings, forms a panorama of industry and of life more astonishing than could be gazed upon from any other point in the universe.

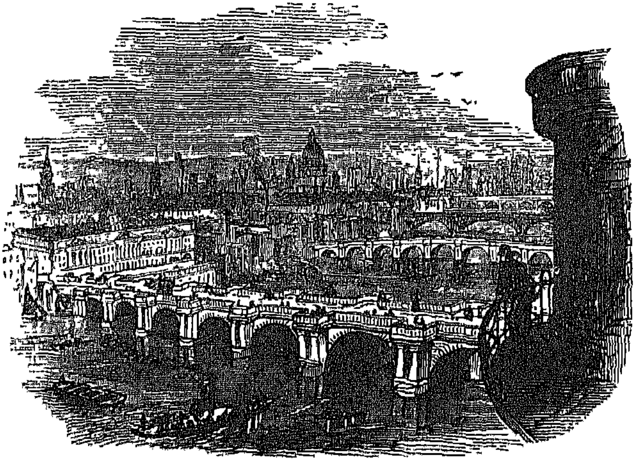
London is equal, in extent, to any three or four other European capitals united, and superior to thirty of the largest towns in the United Kingdom, if brought together. It would require five hundred and thirty-four towns as large as Huntingdon to make another Metropolis; and it is computed that a population, equal to that of Salisbury, is added to London every three months.

Perhaps the finest description of the vastness of London, and the grandeur of the impression it leaves on the mind of the spectator, is that given by "The English Opium-eater."—"It was a most heavenly day in May of this year (1800)," says De Quincey, "when I first beheld and first entered this mighty wilderness. Often have I since then, at distances of two and three hundred miles or more from this colossal emporium of men, wealth, arts, and intellectual power, felt the sublime expression of her enormous magnitude in one simple form of ordinary occurrence, viz., in the vast droves of cattle,—suppose on one of the great north roads,—all with their heads directed to London, and expounding the size of the attracting body by the force of its attractive power, as measured by the never-ending succession of the droves, and the remoteness from the capital of the lines upon which they were moving. A re-action so powerfully felt along radii so vast, and a consciousness, at the same time, that upon other radii still more vast, both by land and by sea, the same suction is operating night and day, summer and winter; and hurrying for ever into one centre the infinite means needed for the infinite purposes, and the endless tributes to the skill or the luxury of her endless population, crowds the imagination with a pomp to which there is nothing corresponding on this planet, either among the things that are, except in ancient Rome. We, upon this occasion, were in an open carriage; and chiefly (as I imagine) to avoid the dust, we approached London by rural lanes, and roads comparatively quiet and shady, collateral to the main ones, where any such could be found. In that mode of approach, we missed some features of the sublimity belonging to any of the common approaches upon a main road; what I mean is, the whirl and uproar, the tumult and the agitaation, which continually thicken and thicken throughout the last eight or ten miles before you reach the suburbs. Already at three stages' distance upon some of the greatest roads, the dim presentiment of some vast capital reaches you obscurely and like a misgiving. The blind sympathy with a mighty but unseen object in your neighbourhood, continues to increase, you know not how. Arrived at the last station for changing horses, Barnet suppose, on one of the north roads, or Hounslow on the western, you no longer think of naming the next stage; nobody says, on pulling up, 'Horses on to London'—that would sound ludicrous; one mighty idea broods over all minds, making it impossible to suppose any other destination. Launched upon this final stage, you soon begin to feel yourself entering the stream as it were of a Norwegian *maelstrom;* and the stream at length becomes a rush. What is meant by the Latin word *Trepidatis?* Not anything peculiarly connected with panic; it belongs as much to the hurrying to and fro of a coming battle, as of a coming flight:



LONDON, FROM HIGHGATE.

agitation is the nearest English word. This trepidation increases both audibly and visibly at every half mile, pretty much as one may suppose the roar of Niagara and the vibration of the ground to grow upon the ear in the last ten miles of approach, with the wind in its favour, until at length it would absorb and extinguish all other sounds whatsoever.—Finally, for miles before you reach a suburb of London, such as Islington for instance, a last great sign and augury of the immensity which belongs to the coming Metropolis, forces itself upon the dullest observer, in the growing sense of his own utter insignificance. Everywhere else in England, you yourself, horses, carriages, attendants (if you travel with any) are regarded with attention, perhaps even with curiosity: at all events, you are seen. But after passing the final post-house *on every avenue to London for the latter ten or twelve* miles, you become aware that you are no longer noticed; nobody sees you; nobody regards you; you do not even regard yourself. In fact, how should you, at the moment of first ascertaining your own total importance in the sum of things—a poor shivering unit in the aggregate of human life? Now, for the first time, whatever manner of man you were or *seemed to be at starting—squire or 'squireen,' lord or lord-*



LONDON, FROM WATERLOO BRIDGE.

ling, and however related to that city, hamlet, or solitary house, from which yesterday or to-day you slipt your cable,—beyond disguise you find yourself but one wave in a total Atlantic, one plant in a forest of America."

To this passage of De Quincey's, we may add another from the distinguished author of the "Letters from Palmyra." He is deeply impressed by the same immeasurable vastness. "Magnitude," he says, "is the distinguishing characteristic of London, as grandeur of natural position and scenery is that of Naples—beauty, that of Florence—moral interest, that of Rome—shops, plate-glass, splendour, that of Paris. But in no other city does the peculiar characteristic of a place so force itself upon one's notice as in London. There you are reminded of magnitude whichever way you turn. You become presently insensible of the beauty of Florence, to the shops of Paris, to the moral glory of Rome, but you never forget for one moment how big London is, how multitudinous its population. When you find, after spending your first week, or more than that, in doing nothing else than scouring the capital from end to end, in order to catch some general notion of the place, that you are as much a stranger as when you began your travels,—that though you have gone so far, you have made no progress,—that though you have seen so much, you know and can remember nothing,—that the city is still as new and unsoiled as ever,—you receive a very lively and even painful impression of its enormous size.

"Every thing else is subordinate to size. Churches are nothing. You pass St. Paul's, and give it only a careless look. Columns and statues, Nelson's and the Duke of York's pillar, even Punch's Duke, you overlook. Magnitude alone interests. This not only interests, it astonishes, absorbs, appals you; annihilates every other feeling. Queen, Lords or Commons, are nothing by the side of this immeasurable vastness. As a stranger, this is the first topic of conversation, and its interest never flags. Yet it is not you, after all, who are so much interested by this size, as the Londoner himself, who is proud of it, and forces the subject upon you. His topics are not of art, pictures and statues, books, literature,—they are not so much to his taste; but of London, its streets, squares, and parks; its extent, the masses always abroad, the crowds in the streets—the number of miles across it, the number of miles around it, its growth, even at present, like that of New Orleans or San Francisco; the countless omnibuses, the packing and tangling of carriages and other vehicles, fifty times a-day, where Farringdon Street crosses over to Blackfriars' Bridge, and the admirable police for keeping all these masses in order. In the presence of London, it is just as it would be if you should meet a man fifty feet high, and of a weight proportionable. You would be in a state of perpetual astonishment. You feel, moreover, as if your individuality were swallowed up, lost, in the enormous mass; as, in the system of the Pantheist, souls are in the divine substance." *

The impression made upon the mind by this magnitude is only superior to that which immediately follows it—that of

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* Mr. Ware. "European Capitals."

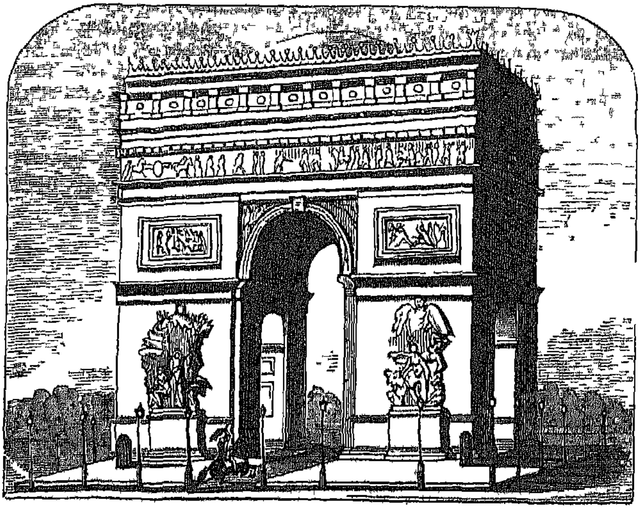
the wealth of the inhabitants. This comes upon you with hardly less distinctness, hardly less overwhelming force, than that made by size.

"In other capitals," Ware goes on to say, "your admiration is directed to the palaces of some of the nobility, one here, and another there; sometimes to a street of palaces, as in Genoa. But in London you note these signs of wealth, not only here and there, but really every where—not only in this street and another, but in street after street beyond counting, and then in square after square beyond counting. And in certain parts of the city, the population seems wholly composed of those who dwell in palaces. The rest of mankind have no place provided for them. And one begins to feel as if that were, there at least, the natural state of man, and as if he himself when he returns home, will find himself lodged in the same way; that you feel particularly in the purlieus of Eaton and Belgrave Squares, and anywhere, in short, at the West End."

TRIUMPHAL ARCHES.

THE most historically remarkable, as well as the loftiest triumphal arch in Europe, is the *Arc de Triomphe de l'Etoile,* in Paris, which was erected to the glory of the French Army, on a part of the immense square of the *Carrousel,* where, in 1812, Napoleon reviewed his troops prior to their departure on the disastrous Russian Campaign; and also where, in 1662, the famous tournament, from which its present name is derived, was held.

This colossal monument was commenced in the year 1806, but in consequence of the political events of 1815 the works were interrupted, and but little progress was made during the ensuing fifteen years, and although in 1823 the government expressed a wish for the works to proceed, it was not until 1830 that any serious and determined efforts for its construction were put forth; and in 1836, exactly thirty years from its commencement, the building was completed. The majestic simplicity, magnificent architecture, and splendid sculptures strike the beholder with admiration and wonder. Its height is about one hundred and sixty English feet, and its breadth one hundred and forty-six, whilst its foundations descend to the depth of twenty-six feet, and its thickness is seventy-three and a half feet. The groups which adorn the sides of the monument are forty feet high, and the figures are about twenty feet The first group on the right



ARC DE TRIOMPHE DE L'ETOILE.

represents the departure of the army for the defence of the country; a warrior takes his weapons, and raises his helmet as a rallying emblem; a young man follows him, and a soldier is in the act of pulling out his sword. In the midst of this scene is a trooper falling from his horse An old man is giving counsel to the leader, whilst of the two last personages, one is bending his long bow, and the other is represented as blowing a trumpet. The Genius of Liberty hovers over to protect and inspire them.

The group on the left represents Triumph. Napoleon, standing in a calm and noble attitude, receives the crown of victory on his forehead, while History, sitting at his feet, is busied in writing his good deeds, and Fame in publishing them. Conquered towns, represented by women crowned with pinnacles, bow down to the hero, whilst a foreign soldier is bound with chains, and his weapons are hung upon a tree.

On the opposite side, facing Neuilly, the group on the right is a representation of Resistance. A young man, guided by a Genius fluttering above him, and attended by his father and his wife, who folds in her arms the dead body of her infant, runs to the defence of his home. And on the left is an image of Peace. A soldier returning from the war, is surrounded by his wife and children, whilst a man leads an ox which he has tamed, and subjects it to the yoke. The Genius of Peace is hovering above, protecting Agriculture, and encouraging Commerce. These two beautiful sculptures are by Etex, and they have more unity, though perhaps less perfection in their details, than those in the foreground, which were the work of many artists, and the general effect of which has been prejudiced from their not understanding the concordance which their work ought to have.

The main arcade is eighty-five feet high and forty-six feet wide, and the lateral vaults are sixty-two feet high and twenty-seven wide. The monument is ascended by a staircase placed in the lateral massives, and you first enter large vaulted rooms, resembling the ancient sepulchres of the Egyptians. After having crossed these rooms, you continue to mount, and when arrived at the summit, you discover one of the most beautiful and delightful landscapes.

On one of the lateral bas-reliefs is a representation of the battle of Austerlitz: Napoleon is heading his Guards, and the Russians amid the thundering of the artillery sink on the frozen moor on which they were standing. Another represents the battle of Jemmapes: General Dumouriez, followed by the superior officers of the army, amongst whom the duke de Chartres (the late Louis Philippe, ex-king of the French) is seen exciting and encouraging the troops.

The large freize above the cornice, is the work of several eminent carvers, the figures are six feet high. In the centre, looking towards Paris, the representatives of the people are distributing standards to the armies. On the lateral faces a representation of the return of the victorious armies, with the spoils of the conquered nations, and France regenerated, and attended by Prosperity and Abundance, is distributing civic crowns.

From the immense height at which these figures are placed, it is very difficult to distinguish them with the naked eye, but with the aid of a prospecting glass, they are easily discerned, and the names of the generals and the battles, which are engraved under the arcades, can also be read. Upon the acroteria a tall bronze statue is placed, the top of which, from the height of the edifice, and the elevation of the ground on which it stands, is level with the loftiest monuments in Paris.

SETTING THE THAMES ON FIRE.

If any wight in the days of witchcraft had undertaken to set the Thames on fire, or even to burn a quart of water, and produce flame from it, as if it were the best of fuel, he would never have accomplished the feat, because he would have been hanged, or drowned, or stoned to death, within an hour of making the announcement. But as, in the present day, we do not hang, drown, or stone persons, even for their pretensions, so we are also a little sparing of hemp in regard to their performances, and are sufficiently enlightened to bear to be startled by something wonderful, without connecting every manifestation of the wonderful with evil influences. In fact, most of the wonders of modern times are linked so intimately with the welfare of man, that instead of Satan and the witches, we look up to heaven in acknowledgment of these blessings, and thank the Universal Father for the gift of that intelligence which has enabled man to accomplish so much.

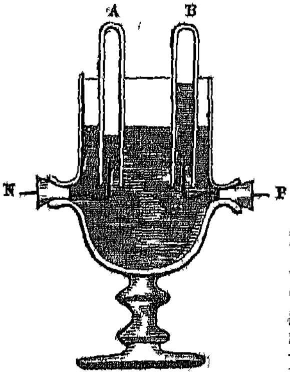
Well, as to setting the Thames on fire! It is no longer doubtful, but a thing certain, that the very same water which the fire brigade employ to extinguish flame may be used as fuel to feed them, and that a shower of rain, a cluster of dew-drops, or a bucket of water, stands us in good stead for boiling the kettle, baking the loaf, or filling the furnace with flames. The man who undertakes this burning up of the lakes, rivers, and seas, and undertakes it too without fear of hanging, drowning, or stoning, is the chemist, and he accomplishes it without the aid of necromancy, but by the laws of nature alone.

Everybody has seen a lightning-flash, and no other agent than a lightning-flash is needed for this water-burning. Water contains two gases—oxygen and hydrogen—in the proportion, by weight, of eight parts of the first to one part of the second. By measure, the hydrogen occupies, when liberated, twice the bulk of the oxygen.

Now, by passing a series of lightning-flashes, or what is the same thing, electric shocks through a body of water, these gases are liberated, and in the proportion to the amount of gas liberated, so is a certain quantity of water destroyed. These gases are all we want for the most active flame; that is to say, hydrogen readily ignites upon the application of flame, and produces the greatest heat of any fuel with which we are acquainted, while oxygen is necessary to the maintenance of fire of every kind, and when present in a pure state, increases the vividness of combustion.

Hence, in the simple elements of water, we have two materials, which, if obtained in a gaseous form, will, upon the application of flame, ignite, and produce water again. In fact, a mixture of oxygen and hydrogen, in the proportion of two measures of the latter and one of the former, will explode with great violence, when the flame is applied to them, or an electric spark passed through them. There is an old-established chemical experiment, in which the gases are exploded in an instrument shaped like a soda-water bottle, and after the experiment, the inner sides of the instrument are found dewed over with the water produced by the combination of the gases. Now, seeing that these gases are capable of ignition, when brought together, and that every cubic foot of water contains 1987 cubic feet of gas, the question remains whether by any means they can be obtained from the water in sufficient quantity for purposes of ignition. Sir Humphrey Davy prophesied that at some future day water would be used as fuel; and, by passing a continuous electric current through a body of water, the gases are separated from each other in a pure state. An instrument has long been in use amongst experimental chemists for performing this operation. It is an urn-shaped vessel, pierced on each side for the admission of the wires of a galvanic battery. Rising from the interior of the vessel, are two tubes, one over the extremity of each wire. As soon as a galvanic current is conveyed through the water by means of these wires, an accumulation of hydrogen gas takes place over the negative wire, and of oxygen over the positive wire. The hydrogen is produced in twice the quantity of oxygen.

In the figure, a glass goblet is represented. On each side are perforations fitted with corks and through these are passed wires communicating with a galvanic battery. A, B, are two glass tubes, both filled with water, and inverted in the goblet, which also contains water. Now, on passing voltaic electricity from P to N (positive to negative), a portion of water is decomposed, or separated into its elements,—oxygen and hydrogen,—both of which, in the separate state, are gases; and passing up into



the tubes, displace that part of the water which remains undecomposed. One tube contains oxygen gas, the other tube hydrogen gas. The hydrogen tube, A, contains twice as much gas as the oxygen tube, B, in obedience to the fact already stated, that the hydrogen, though weighing only one-eighth of the oxygen, nevertheless occupies double its volume.

This is the simple philosophy of the use of water as fuel. But this is not the great question which is now agitating the scientific world. The problems for solution at present are, first, to impart to the hydrogen gas a greater illuminating power—for, when pure, it burns with a pale blue flame, which although giving out intense heat, is almost useless for illumination; and the second, to produce it at so low a cost, as to be worth having.

Since the time of Davy, many sanguine students have endeavoured to win wealth and immortality by achieving so desirable an end. A young chemist of Paris (whose name, we think, was Jobert) attempted to carry the scheme into effect, by decomposing water with a galvanic battery, and then passing the hydrogen through the waste tar and bitumen produced at factories. By this means the hydrogen acquired an illuminating power of great beauty and intensity, but the process was so exorbitantly expensive as to be impracticable.

Some six years since, the subject was again revived by Mr. Shirley Hibberd, of London, whose experiments and inquiries were directed to the question of cheapness. This gentleman. some time since, with an honourable ardour, constructed a model stove, in which a battery, reservoir for water, jet burners, and condensing apparatus, were all compactly arranged together, and the whole, when in action, served either for warming a room, or for cooking food. He also attempted to adapt a continuous battery, in which the acid was made to flow slowly through fine sand, and a medium filled with tar, or some other material rich in carbon, in order to render the whole self-acting, and to attain the desideratum of brilliancy of light. The result of his experiments, however, proved, that in the waste of zinc in the battery, with other expenses incident on the working of the scheme, the cost of gas was at the rate of £2 10s. per thousand feet, while the gas companies were supplying the same at five or six shillings!

So far, the expense of the experiment precludes the practical adoption of this philosophical water-light. There is, however, great hope that science will soon enable us to obtain these gases by means less costly, and that a complete system of illumination by means so simple, may soon be inaugurated. Jobert, of Paris; Jacobi, and M. Hesse, of St. Petersburgh; and Mr. Paine, of America—may be mentioned, as the chemists who have bestowed the greatest attention on this subject recently; and Mr. Paine has hope of producing the gas at 2½d. per thousand feet. The realization of that hope would be one of the greatest of blessings to humanity. There is water in abundance on all hands, it is the most abundant material on the globe, and if we can find a practicable method of burning it, we shall have fuel and light without painful labour, without noxious fumes, we shall be independent of coals, and one extensive branch of really painful and pernicious toil will be superseded.

THE BANIAN TREE.

GREAT confusion exists amongst writers of popular works as to the Banian, or Banyan, and the Banana. In "Reed's Literary Botany" the two trees are so woven together, under the article "Bananas," as to show that the otherwise gifted authoress of that work was entirely ignorant of the true nature of the respective trees. The Banian is of the fig tribe; the Banana is a palm, and is sometimes called the Plantain-palm.

The Banian affords, in its growth, one of the most remarkable provisions for the propagation of the species anywhere to be found in Nature. In all the members of the fig family, we are accustomed to a curious mode of reproduction, the fruit in all cases containing the flower, instead of, as in other trees, the flower containing the fruit. The Banian grows in the stony and sandy districts of the East Indies, where it reaches a vast height, and spreads its branches in every direction. From these lateral branches, small fibres issue, and increase in growth till they reach the earth, where they take root, and form additional stems, united to the parent trunk. Thus the tree is continually increasing, for those newly produced in time send forth their fibres and increase in the same manner.

The extent to which this propagation of the parent stems proceeds, is such, that many of these trees cover an immense area of ground; a square measurement of one thousand seven hundred square yards being frequently covered by the extensions of one tree. On an island in the Nerbeddaun, an immense tree of this kind grows, and bears the name of *Cubbeer Burr*, from a celebratad saint of the Hindus. It was once much larger than at present, but high floods have carried away the banks of the island where it grows, and destroyed much of the outer portions of the tree; yet what remains is about two thousand feet in circumference, measured round the principal stems; the overhanging branches not yet struck down, cover a much larger space. The chief trunks of this tree (each trunk of which exceeds the stems of our English oaks and elms) amount to three hundred and fifty; the smaller stems are more than three thousand, and every one of these is casting out new branches and hanging roots, in time to form trunks, and become the parents of a future progeny. Around this tree the Indian armies encamp, and at certain seasons solemn jatarras, or Hindu festivals, are held there, to which thousands of votaries repair from various parts of the Mogul empire. It is said that seven thousand persons find ample room to repose under its shade. The English gentlemen, on their hunting and shooting parties, used to form extensive encampments, and spend weeks together under this delightful pavilion, which is generally filled with greenwood-pigeons, doves, peacocks, and singing-birds; large families of monkeys live among the branches, and numbers of enormous bats are seen flitting beneath its ample shade; and in the fruit season, when its branches are covered with scarlet figs, it forms a world of vegetable luxuriance and animal enjoyment. Southey, in the "Curse of Kehama," has well described this tree—

'Twas a fair scene wherein they stood,
A green and sunny glade amid the wood,
And in the midst an aged Banian grew.

It was a goodly sight to see
That venerable tree:
For o'er the lawn, irregularly spread,
Fifty straight columns propped its lofty head;
And many a long depending shoot,
Seeking to strike its root,
Straight like a plummet grew towards the ground.

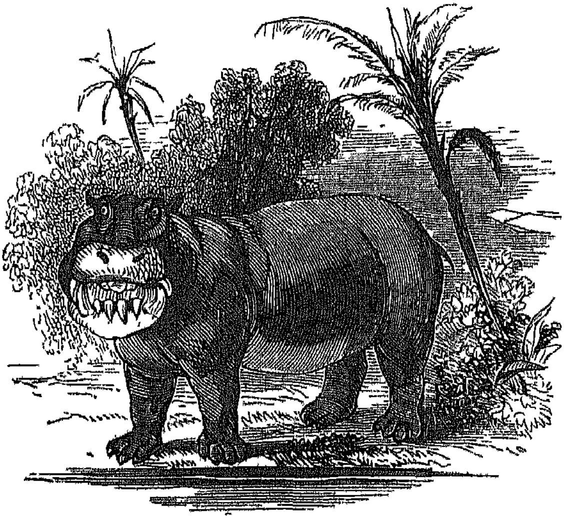
Some on the lower boughs, which cross'd their way,
Fixing their bended fibres round and round,
With many a ring and wild contortion wound:
Some to the passing wind, at times with sway
Of gentle motion swung;
Others of younger growth, unmoved, were hung
Like stone-drops from the cavern's fretted height.
Beneath was smooth and fair to sight,
Nor weeds, nor briars deformed the natural floor;
And through the leafy cope, which bowered it o'er,
Came gleams of chequered light.
So like a temple did it seem, that there
A pious heart's first impulse would be prayer.

A finer description is that by Milton, when referring to the Banian as the tree from which our first parents made their aprons of fig leaves,—

Not that kind for fruit renowned,
But such as at this day to Indians known,
In Malabar, or Deccan, spreads her arms,
Branching so broad and long, that in the ground
The bended twigs take root, and daughters grow
About the mother tree. A pillar'd shade
High over-arch'd, and echoing walks between;
There oft the Indian herdsman, shunning heat,
Shelters in cool, and tends his pasturing herds
At loop-holes cut through thickest shade.

It is not surprising that a production of such a wonderful nature should become the object of superstitious veneration among the Hindus; who look upon it as an emblem of divinity, and regard it as almost divine. Near these trees the most esteemed pagodas are erected; under their shade the Brahmins spend their lives in religious solitude; and the natives of all castes and tribes are fond of retreating in the cool recesses, beautiful walks, and lovely vistas of this umbrageous canopy, impervious to the beams of a tropical sun. Tavernier mentions one of these trees, as growing in his time at Surat, in the hollow trunk of which was the figure of a monster, representing the face of a deformed female, whom they say was the first woman, and call her *Mamanira.* To this tree great numbers of idolaters resort; and a Brahmin is always at hand to offer prayers, and receive presents of rice, millet, and other grains, which the charitable and pious bestow upon them. The Brahmin marks the forehead of all, both men and women, who come to pray in the pagoda, with a kind of vermillion, wherewith he also besmears the idol; for being thus marked, they believe the evil spirit has no influence over them.

THE HIPPOPOTAMUS.



THERE is a large section of animals, in the classification of Baron Cuvier, arranged under the general term pachydermatous, or thick skinned; represented by the elephant, the pig, the tapir, the rhinoceros, and the hippopotamus. The last-mentioned is not the most important of the group; though from the relations of recent travellers, and the great scarcity at all times of specimens in Europe, certainly one of the most interesting. The hippopotamus, or river-horse, is aquatic in its habits, and chiefly confined to Central and South Africa. But for its short, thick, and very blunt muzzle, it might be compared to a gigantic pig; the body is extremely massive, and the legs so short that the belly almost touches the ground; and it is destitute of any covering but a few weak and scattered bristles. The canine teeth are long; the upper ones straight, and the lower curved backwards, so that they rub against each other. Although courageous, these unweildy inhabitants of the waters are in their nature shy, and feed entirely on roots and other vegetables, seeming to prefer those which are partially decomposed to those which are quite fresh.

Throughout the whole of Intertropical and South Africa, except the lower part of the Nile, the hippopotamus abounds; and in the Sunda Islands he is also frequent, though found in none of the Asian rivers. Gordon Cumming, who confronts lions as he would his human debtors, and shoots giraffes as if they were quails or woodcocks, also bags hippopotamuses by scores; and, in his "Lion Hunter," gives some stirring descriptions of their appearance and habits.

One of the most curious traits of the creature is its enormous head, in which the monstrous cavity of the mouth exposes a line of thirty-six large teeth. The tusks, of which there are two in each jaw, sometimes weigh six pounds nine ounces each, and are twenty-seven inches long. The eyes of the hippopotamus, like those of the elephant and rhinoceros, are small in proportion to his bulk. The skin is so hard when dried, that the inhabitants of the interior of Africa are said to make shields of it, that will repel a musket-ball; even in its recent state it is so thick as to be almost impenetrable. The tail is about a foot long, taper, depressed, and naked; and notwithstanding it is an amphibious animal, the hoofs are unconnected with membranes. The measurements of the hippopotamus given by Pennant, are—length of the male, seventeen feet; legs nearly three; the head above three and a-half; the girth nine. He asserts also, that twelve oxen have been found necessary to draw one on shore, which had been shot in a river above the Cape; and that his hide is a load for a camel. There is a slight exaggeration in this statement, due to the fact that Pennant described an animal which he had never seen; nevertheless the dimensions and weight are little less than that stated by him.

At present the hippopotamus is not to be met with in any of the African rivers that run into the Mediterranean, except the Nile; and even there, only in Upper Egypt, and in the fens and lakes of Ethiopia. However, they were formerly seen below the Cataracts; for in the year 1603, Frederico Terenghi, a surgeon of Narni, in Italy, printed at Naples, the history of two hippopotami, which he had taken alive in a great ditch dug on purpose in the neighbourhood of the Nile, near Damietta.

These he killed "by pouring three shots into each of their heads by a large arquebuse. They almost instantly expired, after uttering a cry which had more resemblance to the bellowing of a buffalo than to the neighing of a horse This exploit was performed on the 20th day of July, 1600."

The Caffres in Lower Africa sometimes take the hippopotamus by means of pitfalls, but the animal is so cautious and slow that he often discovers the snare, and avoids it. A favourite mode of hunting him is to watch at night behind a bush close to his path and as he passes, to wound him in the tendons of the knee-joints, by which he is immediately rendered lame, and unable to escape from the *assagais*, or spears, with which he is immediately assailed by the natives. Hasselquist gives an account of another method, which the reader doubtless will accept as a harmless joke. He says that the natives lay a great quantity of peas in the places which the hippopotamus frequents: he eats greedily, grows thirsty, drinks immoderately: the peas swell, his body bursts, and the animal is found in the morning dead.

When in danger, the hippopotamus always flies to the water, where, if the alarm continues, he plunges to the bottom, and may be seen there walking with great ease. He cannot, however, remain long under the surface, but returns occasionally to breathe. Then it is that the conflict commences, and if the hippopotamus cannot escape, he fights desperately, and dies in his hold. Dampier says that a wounded one has been known to open his monstrous jaws, and seize a boat with his teeth, and sink it to the bottom.

In classic history the hippopotamus has played an important part. His name in Greek means "river-horse," and under that name he is mentioned by Lucian, Horapollo, Damascius, Herodotus, and Plutarch. The latter describes him as one of the most wicked animals. It is somewhat strange that the Greeks should give this animal a name signifying *river horse*, when in truth he is so unlike a horse; but the anomaly is to be attributed to their ignorance of an animal which they had never seen. The Egyptians named him *B-ehe-mout*, or *aquatic ox*; and from this root is derived the word Behemoth, in the book of Job, chap. xl. ver. 10. Tatius calls the animal *ippos tou Neilou*, or horse of the Nile, which he says is its Egyptian name Herodotus is the earliest author who gives a detailed description of the hippopotamus. His description however is only correct as to the teeth and skin, and erroneous in regard to the size, feet, tail, mane, and nose. It is strange that Herodotus should err so much on a subject which he had had the means of examining when in Egypt; and still more strange that the description should be repeated almost verbatim by Aristotle. None of the Greeks appear to have seen a live hippopotamus; nor is there any account of a live animal of this species having been brought to Greece, like the live tiger which Seleucus sent to Athens. According to Pliny, the Romans first saw the hippopotamus in the year 58 B.C., when one was exhibited at the games, along with five crocodiles, in a temporary canal. Dio Cassius says that Augustus Cæsar exhibited a rhinoceros and a hippopotamus to the Roman people, in the year 29 B.C.; and Commodus, amongst his various exploits, killed as many as five hippopotami. Firmus, however, surpassed these exhibitions, and gave a precedent to Waterton in after times, by riding on the back of a hippopotamus, hoping thereby to prove his fitness to govern the empire. Achilles Tatius, who wrote as late as the fifth century of our era, speaks of the hippopotamus as a creature breathing fire and smoke; while Damascius, who was nearly his contemporary, says it is the most unjust animal, because it kills its father, and commits every possible outrage upon its mother. In the hieroglyphic writing the hippopotamus was employed to signify injustice.

The Roman coin here depicted bears on one side the portrait of Marcia Otacilia Severa, the wife of the emperor Philip; and on the reverse the figure of the hippopotamus. This was struck on the occasion of Philip's celebration of the Secular Games, when Rome was supposed to have attained the period of a thousand years from the foundation. The coin itself is of brass, exactly the size of the engraving, and on the reverse are the letters usual on Roman coins; S. C. Senatus Consulto, and the legend "SÆCULARES AUGG," by which are to be understood the words "Ludi Sæculares Augustorem," or the Secular Games of the Augusti, celebrated by Philip and his son, whom he had appointed his associate in the empire.

On the side of the coin which shows the portrait of the empress, is the legend: "MARCIA OTACIL SEVERA AUG." The legend on the reverse of the coin shows, beyond doubt, that the hippopotamus was exhibited to the Roman people on the celebration of the Secular Games, and was considered by them as a rare and curious animal

From the time of Commodus there appears to have been no living specimen in Europe till the arrival of one in England in May 1850. Mr. Mitchell, the manager of the Zoological Gardens, Regent's Park, had long desired to obtain a living specimen of three rare animals, the African elephant, the hippopotamus, and the rhinoceros. The elephants hitherto exhibited in this country are from Asia; the hippopotamus has recently been obtained, and the rhinoceros, which lived very comfortably in the Society's gardens for fifteen years, was of the Asiatic species.

THE INTERNAL FIRES OF THE EARTH.

THAT truth is stranger than fiction, has become so acknowledged an axiom, that we need no longer to set forth its claims. The everyday achievements of science, which shame continually the imagined wonders of the fabulists, are so much the common property of the world, that even they are falling into common place, and steadily becoming things of course. It is well that it is so, for though it is pleasant to feel a thrill of wonder, and still more pleasurable to contemplate the wonderful when it has a substratum of truth, and depends on fiction no longer for its claims, still, while the imagination is dazzled by the marvellous, the understanding is incapable of its full appreciation, and no practical result follows until wonder ceases. There is no department of science but furnishes instances of the truth of this, and in entering upon a short description of the internal fires of the world we have another exemplification of the difficulties with which the understanding must cope when imagination gives vividness to a newly-discovered truth.

Though the idea is as old as humanity, the fact is almost as new as to-day, that below the surface of the earth a raging fire burns; and that the existence of this fire may be demonstrated beyond all doubt by facts which appeal alike to sense and thought. The proof is recent, for Geology is only yet in its swaddling-clothes, though, like Hercules, strong in its infancy; and while the demonstration of this fact is new, the fact itself appeals chiefly to the imagination, and the internal fires are essentially wonderful.

"A raging fire below the surface of the earth," we said; a raging fire all through the earth, we mean; for the globe is molten within, and agitated as a huge furnace; but as a furnace exceeding in the fierceness of its fire any of the illustrations within reach of the human experiences; a furnace of near eight thousand miles in breadth; and consisting wholly of rocky matter, all fluid, and seething under intense heat, and enclosed in a thin shell, on the surface of which we live.

The ancients fabled Vulcan working at his forge in the Isle of Lemnos; but the modern geologist finds the Vulcanic force spread all over the world, and, from the several vents in the surface crust, he sees the escaping flame hissing and spurting and sending forth its fiery hail and showers of destruction in obedience to laws which his science explains without the aid of any fabulous personage. The steps by which this deduction is arrived at are few and simple. They are based on certain phenomena, the existence of which is undisputed; but the cause of which we have here to state and exemplify. Volcanos, earthquakes, hot springs, and the aspects of existing rocks, are the presumed evidences of this internal fire. On all hands these things exist, and the question remains, why? Sir Humphrey Davy suggested that volcanic eruptions were occasioned by the meeting together of certain bodies, which in the process of uniting caused a violent combustion; but if such an explanation were accepted of a few of the occasional outbreaks of volcanic force, it fails seriously in reference to those mountains which are continually burning, and is utterly inadequate to explain why volcanos are sprinkled all over the earth; in the Arctic regions, in Central Asia, South America, Europe the West Indies, and Africa. There are only two or three combinations, such as that of sulphur and iron, which, under the supposed circumstances, could occasion such eruptions; and it seems most unreasonable to suppose that these materials are arranged within the funnel of every crater in the exact proportions and conditions necessary for such violent outbreaks as occur; and positively absurd to conceive the existence in the necessary spot of materials in the necessary condition for the support of those volcanic fires which seem to have burned from time immemorial, and are raging now as fierce as ever.

Again, hot springs, and still more strikingly, boiling springs, seem to owe the heat they possess to some cause much more remote than such chemical mixtures as we have been supposing; for in the first place, many of them are as constant as the ceaseless craters; while, if the heat were caused by chemical agency, we must suppose the materials long ago to have been exhausted, especially in fountains of such volume and constancy as the Geysers of Iceland. And not only is the chemical theory insufficient to account for the constancy of the heat manifested; but if the heat owed its origin to superficial causes, why do we not find dissolved in these waters the elements which have given it birth? instead of which, it is well known that the majority of such springs contains no materials adequate to the production of their high temperature.

It is still more worthy of remark, that all pits, mines, and excavations, exhibit an increase of temperature the deeper we descend; and that all springs which issue within such places are warmer the deeper their source; so that, in fact, the deeper we descend towards the interior of the earth the hotter does the earth become, and this so definitely that the increase is found to be one degree of heat for every forty-five feet of descent.

Going back to the Cyclopean theory, all these phenomena are explained in the most simple manner. The shape of the earth is just that which a *fluid* body would assume under the influences of gravitation and rotation on its axis. Now, regarding the earth as a body kept constantly fluid by its intense heat, any change upon the cooled and consolidated surface would have an influence on the fire within, and if fissures in the crust occurred, the flames would burst through and rage with great violence, until the ejected matter closed the orifice again. To produce such a change we have an agent of sufficient power always in readiness. The soft air which fans the cheek of beauty into rosy blushes, and bears to the invigorated sense the freshening perfume of the summer flowers, is potent enough at any time to crush down this piecrust of solid material, and form gaps for the escape of the pent up flames. The atmosphere is known to press upon the earth at the rate of fifteen pounds to every square inch. It is this pressure which keeps our piecrust down. A slight *increase* of the pressure would force it into the burning flood, and a trifling *decrease* of pressure would suffer the struggling forces to break through from below, and the molten fluid to be cast upon the surface. Now it happens most strangely and most fatally for the chemical theory, that earthquakes invariably happen at a fall of the barometer; that is, when the air becomes slightly thinner, less heavy, and consequently less capable of treading down the crust upon the tops of the imprisoned flames. Over a hundred miles of country the removal of atmospheric pressure will sometimes amount to nearly two millions of tons, which is a sufficient relaxation of force to permit the outbreaks of an earthquake.

There is another agent almost equally diffused, and that is water. In nearly all cases existing, active volcanos are situated near the sea; the few situated inland being wholly or partially extinct. Water trickling through gaps or chasms and finding its way to the hot soil below will be suddenly converted into steam, which will immediately fight for its escape. In the sharp struggle which will ensue the fiery tide will be protruded; and in the hour of this convulsion huge masses of molten rock will be belched out and left to cool in the air, in the shape of lavas, granite peaks, or islands, and heaps of cinders.

Here are explanations of existing phenomena at once simple and satisfactory. Nor for the present circumstances of the globe only do these conclusions testify, but they carry us back into the past, and afford vivid pictures of the convulsions by which the earth has been wrought to its present shape and aspect. Imagine a globe of fire darting through the abysses and continually radiating heat from its surface into surrounding space, and becoming cooled in its outer limits. The crust will cool, and at last it will be possible for the atmosphere to sustain a cloud. The soil, though solidified, is still red-hot, and when the cool rain falls upon its surface it will crack and shiver into zig-zag seams, and the water will flow through upon the fluid fire below, and the steam, fighting for a passage will drive the rocks like feathers before it, or will send them through the crust above like arrows, and leave them to tell to after ages the story of this strange commotion. Flung about on plains, and slopes, and mountain tops, we see such blocks and masses as might have been thrust out in this way, and the whole series of trap rocks point to similar agencies for their origin, and proclaim the intensity of the heat under which they were fused, and the potency of the ejective force which made them pierce through the solid plates of the earth's rocky armour, as if they were but sleet driven before the wind. It may still be said that mechanical accidents have brought these trap rocks to the surface, but no mechanical accident will account for the scorching which the rocks have suffered on both sides of such traps: nothing but heat could have burnt and blackened them as we find them now in most cases where igneous rock has forced through superficial strata.

Counterparts of these ancient revolutions are not wanting in the present day. The sudden uprising, in 1831, of Hotham Island from the bosom of the ocean off the coast of Sicily: the evident volcanic formation of Ascension Island, in the South Atlantic; the earthquakes of Lisbon, Peru, Jamaica, and Sicily, are all so many evidences of the existence and activity of the same forces which in the geological ages built up the ramparts of the Alps and flung the Himalayas, like drops of fiery spray to the clouds, to cool, and consolidate, and remain for ever, the monuments of volcanic power. In the age when the earliest showers descended on the red-hot soil we can conceive those immense cracks and fissures to have been formed; some of which we now find extending across the Pacific and along the West Indies down the coast of South America. In these localities volcanic and earthquake eruptions are most common, as if the sea-water now and then found its way through the ancient fissures and trickled on the fluid lava below, and hence gave rise to the fearful outbreaks which in those regions are so common.

These internal fires, the existence of which seems so capable of demonstration, are more definitely understood in regard to their force and extent than might seem possible under the peculiar circumstances by which their nature has been studied. What will be said if we state that we can guage these fires, and ascertain their rate of increase downwards? And yet even this is easy, when a comparison is made of the results obtained by miners, by borers of wells, and by observers of the temperature of thermal springs. A wide comparison of, and a careful deduction from, these elements, shows that the heat increases as we descend at the rate of one degree to every forty-five feet, and that if we estimate the thickness of the crust at one hundred miles, the heat, at seven thousand two hundred and ninety feet, will be sufficient to boil water; at twenty-five thousand two hundred feet, sufficient to melt lead; at seven miles, it will maintain an intense glowing red heat; it will melt gold at twenty-one miles, cast iron at seventy-four miles, soft iron at ninety-seven miles, and at one hundred miles, where the fluidity begins, the heat will exceed any with which man is acquainted, not forgetting the intensity of the electric spark or the continued action of the voltaic battery, which melts platina as if it were wax, and surpasses the power of man to measure its intensity. Below this is the fluid lava, writhing and seething; that which on the surface is hardest adamant, is here limpid as boiling water, ready to flow out into the cool air and devastate the upper world whenever a fissure or a crater opens.

And yet we live securely in our green household; none of this immeasurable heat consumes us; but the world maintains its verdure, and is watered all over by cool streams, which splash and sparkle and flow on in the sunshine in no fear of fire to consume them. We have an atmosphere, which to the sense is the most evanescent, intangible, and yielding thing, which nevertheless possesses force sufficient to press down this thin shell of solid matter and maintain a safe equilibrium all over the world. The pressure of this thin breezy belt of air is equal to 12,043,468,800,000,000,000 pounds over the whole exterior of the globe; and it is the constant action, the continued and almost unchanging force of this, which provides for our safety and comfort on the outside of this fluid and fiery ball. But such provisions go all through nature, and every existence is beset with perils. But to the perils there are counteracting agencies, and the working of the whole preserves the whole, no less for the good of each individual than for the completion of a creation, every part of which is "good."

EARTHQUAKES.

EARTHQUAKES are unquestionably the most dreadful of the phenomena of Nature; and are not confined to those countries which, from the influence of climate, their vicinity to volcanic mountains, or any other similar cause, have been considered as more particularly subject to them.

Their effects have often been felt in the British Isles, although not in so extensive and calamitous a degree. The most remarkable earthquakes of ancient times are described by Pliny, in his Natural History. Among the most extensive and destructive of these, was one by which thirteen cities in Asia Minor were swallowed up in one night. Another which succeeded, shook the greater part of Italy. But the most extraordinary one described by him, happened during the consulate of Lucius Marcus and Sextus Julius, in the Roman province of Mutina. He relates that two mountains felt so tremendous a shock, that they seemed to approach and retire with a most dreadful noise. They at the same time, and in the middle of the day, cast forth fire and smoke, to the dismay of the astonished spectators. By this shock several towns were destroyed, and all the animals in their vicinity killed. During the reign of Trajan, the city of Antioch was, together with a great part of the adjacent country, destroyed by an earthquake; and about three hundred years after, during the reign of Justinian, it was again destroyed, with the loss of forty thousand of its inhabitants. Lastly, after an interval of sixty years, that illfated city was a third time overwhelmned, with a loss of sixty thousand souls. The earthquake which happened at Rhodes, upwards of two hundred years before the Christian era, threw down the famous Colossus, together with the arsenal, and a great part of the walls of the city. In the year 1182, the greater part of the cities of Syria and of the kingdom of Jerusalem were destroyed by a similar catastrophe; and in 1594 the Italian writers describe an earthquake at Puteoli, which occasioned the sea to retire two hundred yards from its former bed. The great earthquake of 1755 extended over a tract of at least four million of square miles. It appears to have originated beneath the Atlantic Ocean, the waves of which received almost as violent a concussion as the land. Its effects were even extended to the waters in many places where the shocks were not perceptible. It pervaded the greater portions of the continents of Europe, Africa, and America; but its extreme violence was exercised on the south-western parts of the former. Lisbon, the Portuguese capital, had already suffered greatly from an earthquake in 1531; and, since the calamity about to be described, has had three such visitations, in 1761, 1765, and 1772, which were not however attended by equally disastrous consequences. In the present instance, it had been remarked, that, since the commencement of the year 1750, less rain had fallen than had been known in the memory of the oldest of their inhabitants, unless during the spring preceding the calamitous event. The summer had been unusually cool, and the weather fine and clear for the last forty days. At length, on the 1st of November, about forty minutes past nine in the morning, a most violent shock of an earthquake was felt; its duration did not exceed sixty seconds; but so powerful was the concussion, that it overthrew every church and convent in the city, together with the royal palace, and the magnificent opera-house adjoining it; in short, not any building of consequence escaped. About one-fourth of the dwelling-houses were thrown down; and at a moderate computation, thirty thousand individuals perished. Between the 1st and 8th of November, twenty-two shocks were reckoned. This earthquake was also felt at Oporto, Cadiz, and other parts of Europe, and equally severe in Africa. A great part of the city of Algiers was destroyed. In many places of Germany the effects of this earthquake were very perceptible; but in Holland the agitations were still more remarkable. The agitation of the waters was also perceived in various parts of Great Britain and Ireland. At sea, the shocks were felt most violently. Among other catastrophes, the Captain of the *Nancy* frigate, off St. Lucar, felt his ship so violently shaken, that he thought she had struck the ground, but on heaving the lead, found she was in a great depth of water. The earthquakes in Sicily and the two Calabrias began on the 5th of February, 1783, and continued unto the latter end of the May following; doing infinite damage, and exhibiting at Messina, in the parts of Sicily nearest to the continent, and in the two Calabrias, a variety of phenomena. The earth was in a constant tremor, and its motions were various, being either vertical or whirling round,—horizontal or oscillatory, that is, by pulsations or beatings from the bottom upwards. There were many openings, or cracks in the earth; and several hills had been lowered, while others were quite level. In the plains, the chasms were so deep that many roads were rendered impassable. Huge mountains were severed, and portions of them driven into the valleys, which were thus filled up. The total amount of the mortality occasioned by these earthquakes in Sicily and the two Calabrias was, according to the official returns, thirty-two thousand three hundred and sixty-seven; but Sir William Hamilton thought it still greater, and carries his estimation to forty thousand, including foreigners. The shocks felt since the commencement of these formidable earthquakes amounted to several hundreds; and among the most violent may be reckoned the one which happened on the 25th of March. It affected most of the higher parts of Upper Calabria, and the inferior parts of Lower Calabria, being equally tremendous with the first. Indeed these shocks were the only ones sensibly felt in the capital, Naples. Two singular phenomena are recorded with relation to the former. At a distance of about three miles from the ruined city of Oppido, in Upper Calabria, was a hill, having a sandy and clayey soil, nearly four hundred feet in height, and nine hundred feet in circumference at its base. This hill is said to have been carried to the distance of about four miles from the spot where it stood, into a plain called Campo de Bassano. At the same time the hill on which the city of Oppido stood, and which extended about three miles, divided into two parts, being situated between two rivers: its ruins filled up the valley, and stopped their course, forming two large lakes, which augmented daily. By the earthquake experienced in Chili in 1822, a great line of coast is stated to have been lifted permanently up to the height

EARTHQUAKE IN CALABRIA.

of several feet above its former level; and it is deserving of remark, that though earthquakes are sometimes felt in the interior of countries, their most terrible effects occur chiefly along the coast. On the 2nd of March, 1825, the city of Algiers was visited by a tremendous earthquake, which destroyed at least ten thousand human beings. It is also worthy of remark that the same phenomena which generally precedes the eruptions of Mount Etna and Vesuvius, namely, all the wells and fountains in the neighbourhood becoming perfectly dry, occurred at Bluda on this occasion. The barometer had fallen gradually for some days before the earthquake; and the thermometer rose suddenly from fifty-eight to sixty-two and a half degrees on the day it happened.

INSECT WONDERS.

Every variety of animal life, as well as every other department of the universe, has its peculiar sources of interest; and the insect world forms no exception. Indeed it would be difficult to say whether there exists more of the elements of wonder, among those tiny denizens of the earth, or among its other inhabitants of a more commanding presence and a nobler form.

Insects are not so many rude scraps of Creation scattered up and down without significance or destiny. Many of these little beings are among the most finished specimens of the Creator's skill; wonderful in their minuteness, displaying the most inconceivably delicate organisms, all perfectly formed, and operating with the exactest precision; and in some instances decked in such splendour and perfection of colour, that while they may excite the utmost admiration, are still far beyond the reach of the artist's skill.

The common fly, is an instance of this wonderful and delicate organism to which we have just referred. Who has not marked the difficulty, though the movement might be as rapid as lightning, of laying his hand upon one of these little creatures. They are protected, not so much by their strength or swiftness, as by their power of sight. Having many enemies and no place of retreat, they have need to be vigilant, and always on the out-look. The head, however, is a fixture, incapable of being turned in any direction. But to more than compensate for the difficulty and danger of this incapacity, nature has armed her not merely with a retina, but a legion of eyes, each fly being said to possess no less than *eight thousand*. By means of this amazingly perfect and delicately arranged apparatus, she sees on every side without any motion of the eye or movement of the neck, every object within the range of vision.

"The dress of insects," says Hervey, "is a vesture of resplendent colours set with an arrangement of the brightest gems. Their wings are the finest expansion imaginable, compared to which lawn is as course as sackcloth. The cases which inclose their wings, glitter with the finest varnish, are scooped into ornamental flutings—are studded with radiant spots, or pinked with elegant holes. Not one but is indued with weapons to seize their prey, and dexterity to escape their foe; to despatch the business of their station, and enjoy the pleasure of their condition."

The *strength* of some insects is exceedingly wonderful as compared with their size. There is no other animal whose muscular capacity can be put in competition with that of the Flea. On a moderate computation, it is known to leap to a distance of at least two hundred times its own length. There is not the slightest proportion between the *force* and *size* of the insect tribe. Had man an equal degree of strength with one of those nimble and disagreeable companions, the renowned power of Sampson would sink into insignificance. A flea has been known to draw a chain a *hundred times heavier than itself*, and its devouring capacity is of equal magnitude, for it will eat *ten times its own weight* of provisions in a day. Many deeply interesting experiments have been made in illustration of the strength of this little animal. "Mr. Boverick, an ingenious watch-maker, who some years ago lived in the Strand, London, exhibited to the public a little ivory chaise with four wheels, and all its proper apparatus, and a man sitting on the box, all of which were drawn by a single flea. He made a small landau, which opened and shut by springs, with six horses harnessed to it, a coachman sitting on the box, and dog between his legs, four persons were in the carriage, two footman behind it, and a postillion riding on one of the fore-horses, which was also *easily drawn along by a flea.* He likewise had a chain of brass, about two inches long, containing to hundred links, with a hook at one end, and a padlock and key at the other, which the flea drew very nimbly along." "In the year 1578, and the twentieth of queen Elizabeth, Mark Scaliot, a blacksmith, made a lock, consisting of eleven pieces of iron, steel, and brass, with a hollow key to it, which altogether weighed but one grain of gold. He likewise made a gold-chain, composed of forty-three links, which he fastened to the lock and key, and having put them about the neck of a flea, they were drawn with ease, which being done in her Majesty's presence, he put the lock and key, flea and chain into a pair of scales, and they altogether, weighed but one grain and a half." The ingenious pieces of mechanism mentioned in these anecdotes are quite as wonderful as the performances of the insects.

Notoriously disagreeable as these gentlemen are as companions, there is an instance on record of a lady who kept one for her amusement. It is thus recited by an eye-witness:— "Being sent for to attend a foreign lady who was greatly afflicted with the gout, and having staid by her desire to dine with her, she bade me take notice of a flea on her hand. Surprised at such discourse, I looked at the hand, and saw indeed a plump and pampered flea sucking greedily, and kept fast to it by a little gold chain. The lady assured me she had *nursed* and kept the little animal, with exceeding great care, at that time, *full six years*, having fed it twice every day with her blood, and when it had satisfied its appetite, she put it up in a little box lined with silk. In a month's time, being recovered from her illness, she set out from Copenhagen with her flea, but having returned in about a year after, I took an opportunity of waiting upon her, and among other things, asked after her little insect. She answered me with great concern, that it died through the neglect of her waiting-woman.

The affectionate regard manifested by this lady for her little blood-sucker reminds us of another example of attachment to an insect still more disagreeable than a flea. The case we are about to mention, was the subject of a beautiful picture, called *Le Bal de Watteaux,* which was for some time held in the highest estimation on the continent by the most celebrated artists. A French writer, of the name of Pelison having given offence to the government, was thrown into prison, the *Bastile*, and as was usual during the reign of Louis the Fourteenth, was denied the privilege of the visits of his friends, and had to live on bread and water, without the companionship of any book or the use of pen and ink. After some months of confinement, life became almost insupportable to poor Pelison, till at last he became acquainted with a spider, which he *rendered familiar* by frequently giving it crumbs of bread, and *the insect used to spin down for the same as soon as he saw the captive at his meals.* Observing this, Pelison's sufferings were in some measure softened, as even the care of the spider was to his sensitive and kindly heart a gratifying employment. He was no longer alone, and found comfort in that thought. But one day the gaoler brought the bread and water later than usual, and was still in the cell when the spider spun down for his accustomed repast. Immediately Pelison threw it a few crumbs, but this act of compassion highly offended the gaoler, who loaded the prisoner with reproaches for so vile an amusement, and with one of the large keys in his hand unmercifully killed the poor insect, which deprived Pelison of his lonely companion, and for the first time made him shed tears.

The *irascibility* of spiders has no comparison except in the most savage of brute animals. When those of equal size meet in combat, neither of them ever yield, but hold each other by their fangs so fast, that one of them must die before they are separated. And the *artifice* of the spider is not less characteristic than her savageness. The old ones prevail upon the young to yield up their habitations, which they frequently do, either out of respect for age, or fear of punishment; but if the old spider can find none of its species that will either from affection, or the fear of its pincers, resign its home, she must then perish from want of shelter and subsistence; as like Methusalem, old spiders seem to have no mind to build a house in their old age. Their *ingenuity* is also remarkable in effecting difficult passages—as from the top of a stick surrounded by water, or from other dangerous positions. In such cases, discovering the ordinary means of retreat cut off, they ascend to the highest point and eject their web, which the wind soon carries to some contiguous object, and along which, after repeatedly testing its strength, the sagacious insect effects his escape.

Spiders are of various sizes; but there are some which are immensely larger than any known in this country, and which are not only disagreeable and dangerous, but even frightful. The gigantic *Aranea Avicularia*, or bird-catching spider, common to the East Indies and South America, is of this description. It resides among trees, frequently seizing on small birds, which it destroys by wounding with its fangs, and afterwards sucking their blood. The slit or orifice near the tip of the fangs in spiders, through which the poisonous fluid is evacuated, and the existence of which has sometimes afforded so much doubt among naturalists, is said, in this insect to be so visible, that it may be distinctly perceived without the aid of a glass. But Dr. Solomon Reiselius gives an instance of the death of a man occasioned by the bite of an ordinary spider; and an ancient writer records the following battle between a spider and a toad:—"I observed a spider descend down a wall to a place where a toad lay, and perceived the spider touch the toad and retire, upon which the toad immediately swelled very big, and leaped to a plantain leaf, and eating a bit of it, her swelling abated, and she returned to the place where she was before, and was again assaulted by the spider with the same effect and remedy, till upon the third time the relator plucked up the plantain leaf, upon which the toad, wanting to counteract the poison, burst, and died immediately, and the spider then walked away."

We may mention, as a curious fact, that there is a spider, a native of Italy, Cyprus, and Barbary, and the East Indies, which is simply an annual, shedding its skin in July, and dying early in the winter. These spiders lay about seven hundred and thirty eggs; but never live to see their progeny.

Wasps also afford very marvellous instances of sagacity and savageness, though, unlike bees or ants, they seem to be destitute of the instinct of forecast, making no preparation for winter, and feeding often with almost equal relish upon flesh and fruits. Dr. Darwin relates the following circumstance, which fell under his own observation, and shows something analogous to the power of reasoning as it is exercised among men. "A wasp on a gravel walk had caught a fly, nearly as large as himself, and kneeling on the ground, I observed him," says the doctor, "separate the tail and the head from the body part, to which the wings are attached. He then took the body part in his paws, and rose about two feet from the ground with it; but a gentle breeze wafting the wings of the fly, turned him round in the air, and he settled again with it upon the gravel. I then distinctly heard him *cut off with his mouth, first one of the wings and then the other*, after which he flew away with it unmolested by the wind." In carrying out dead companions from the nest, they frequently, if they find the load too heavy, cut off the head, evidently in order to reduce the weight; when the task is duly performed.

"I observed," says Mr. Ray, "one of them dragging a green caterpillar thrice its own size; it laid this down near the mouth of a burrow that it had made in the ground, then removing a little ball of earth with which it had covered the orifice, it first went down itself, and, after staying a short time, returned, and seizing the caterpillar again, threw it down into the hole. Then leaving it there, it came up, and taking some little globules of earth rolled them one by one into the burrow, scraping the dust in by intervals, with its fore feet, in the manner of a dog, thus alternately rolling in pieces of earth, and scraping in dust, till the hole was full; sometimes going down, as it seemed to me, to press down the earth, and once or twice flying to a fir tree, which grew near, perhaps to get turpentine to glue it down and make it firm. The hole being filled and equalled with the superfices of the earth, that its entrance might not be discovered, it took two fir leaves that were near, and laid them by the mouth, most probably to mark the place."

There is an insect, called the praying *Mantis*, which denotes soothsayer, and which, in its general sitting posture is observed to hold up the two fore-legs slightly bent, as if in an attitude of prayer. For this reason it possesses among the superstitious the reputation of a sacred animal, and a popular notion has prevailed, that if a child or traveller lose his way, he will be sure to find it, on observing the direction in which this animal points when taken into the hand. But its nature is the very reverse of sanctity. It devours with the utmost voracity smaller insects, and is desperately pugnacious, fighting to the death its own species. Roësel, who kept some of these insects observes, that in their natural conflicts, their manœuvres very much resemble those of hussars fighting with sabres, and sometimes one cleaves the other through at a single stroke, or severs the head from the body. During these engagements the wings are generally expanded, and when the battle is over, the conqueror devours his antagonist.

Among the Chinese this quarrelsome property in the Mantis is turned into a similar entertainment with that afforded by fighting cocks, which used to disgrace and be so common in our own country. And it is to this insect, or one closely allied to it, that the following passage in Mr. Barrow's account of *China* alludes. "They have even extended their inquiries after fighting animals into the insect tribe, and have discovered a species of Gryllas, or Locust, that will attack each other with such ferocity as seldom to quit their hold, without bringing away at the same time a limb of their antagonist. These animals, which are about three inches in length, of a slender shape and of a beautiful green colour, are fed and kept apart in bamboo cages, and the custom of making them devour each other is so common, that, during the summer months, scarcely a boy is to be seen without his cage of grasshoppers."

The Mantis Precaria is a native of many parts of Africa, and is the supposed idol of the Hottentots, which those superstitious people are reported to hold in the highest veneration; the person on whom the adored insect happens to light, being considered as favoured by the distinction of a celestial visitant, and regarded ever after in the light of a saint.

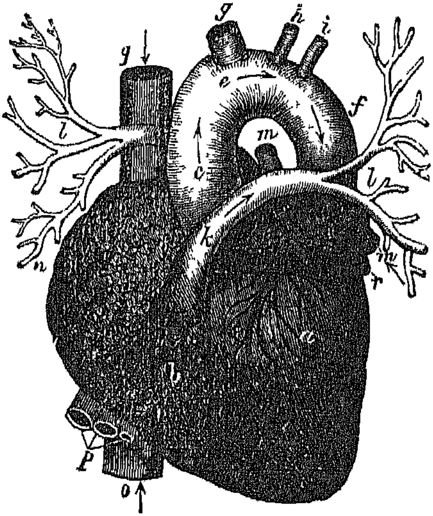
Many other instances of the savage propensities and amazing powers of insects are on record, to which, as well as to other wonderful peculiarities of the insect tribe, we will call attention in a subsequent paper.

WONDERFUL HUMAN ORGANS.

THE HEART.

SIGHTS and views are always being brought under our notice by speculators and persons interested as dealers in novelties. A gentleman not long since attended worship in a church in the north of France, and expressed so much astonishment and admiration of the material structure, that his friend was provoked, and said, Why do you not see the churches at home, and then you would see that this is but a model.

Now what need have we expressing surprise at machinery when we have the model at hand from which so much is fashioned? Take the Heart within us, the great centre and seat of life—an immense muscular organ, a force-pump of great power, collapsing and expanding from the moment of birth until the period of death, ceaselessly, regularly, and precisely, *four thousand times every hour;* passing about 250lbs. of blood over the system through the arteries and back by the veins and *vena cava* to the heart again. Fourteen times every hour must this blood, which is about 25lbs. weight, pass through the system. Many plans have been resorted to, to show the strong resisting muscular power of the heart. The blood in a healthy person is strong enough to carry on its pulsations, or to send its jets of vital fluid to the furthest extremity of the system, though the toe should be made to support a 50lbs. weight. The contrivance being one of many so purely mechanical, that the great Machinist who constructed it leaves it as a monumental evidence of His supremacy. Two chambers above, called Auricles, and two below, called Ventricles, form a duplicated cistern, the one for receipts and the other for disbursements; but the perfectness of this machine is that it has what might be called a guaging power and a testing power. There is no excise power within, and yet the quantity is guaged; if too much blood was manufactured this machine is incompetent to dispense it; it can only do so much, more breaks it down, and it must stop. It cannot do with less, that would be insufficient for its purposes, it would hence become weak, languid—the body would become prostrate, and industry and effort would terminate. The testing power too is equally wondrous, this blood has a *standard* and *quality;* it is the motive force propelling the machine. Accurately prepared it gives clearness to the vision, accuracy to taste, and keenness to the senses; by the goodness of its quality the head thinks and the body moves —gases and substances enter into combination, and minute particles, like so many little errands-men, run from one end of the human system to the other, depositing and gathering up, as the great master power, the heart, desires. Blood from the heart makes the hair, the lenses of the eye, the tympanum or drum of the ear, the bone and marrow within it, the muscle, vein, and arteries, and sheathes in which they are folded up: impediments are forcibly removed by sneezing, by coughing; and the heart beats on, ever exhausting its internal resources and ever drawing upon new. We build steam-engines and stand amazed at their powers, but forget that if we put a machine of forces beside the human one, engaging the equality of power, we find the man beating the engine; an engine is only so much more mighty because there are so many forces or powers combined. Suppose we wanted to reach the summit of Mont Blanc, a man would spend two days of twelve hours each, and in this time would burn on an average about 9½oz. avoirdupois of carbon, or an equivalent quantity of hydrogen. Now, were a steam-engine of the same dimensions employed for the same purpose, and the same average time to climb to the same altitude, it would consume from 2lbs. 8oz., or 3lbs. avoirdupois in the service. Considered, then, as a machine deriving the whole of its powers from the carbon it consumes, the body of a man is at least three times or even four times more perfect in its mechanism than a steam-engine. From the accurate supply and the just circulation of the blood is derived all the strength and all the activity; so that as steam is the motive power of the engine, blood is the motive power of the man.



THE HEART.

The accompanying illustration represents the heart; and *a*, the left ventricle; *b*, the right ventricle; *e.f.* the aorta, the great artery that goes off from the left ventricle; *g h i*, the arteries that are sent from the arch of the aorta; *k*, the pulmonary artery, that goes from the right ventricle to the lungs; *l l*, branches of the pulmonary artery, going to the two sides of the lungs; *m m*, the pulmonary veins, which bring the blood back from the lungs to the left side of the heart; *n*, the right auricle; *o*, the ascending vena cava; *q*, the descending; these two meet, and by their union form the right auricle; *p*, the veins from the liver, spleen, and bowels; *s*, the *left coronary artery, one of the arteries which nourish the heart.*

WONDERFUL RAINS.

Among the extraordinary phenomena which ever and anon occur, giving variety, and for a time apparently intercepting the regular course of Nature, may be mentioned what are called preternatural rains, such as the raining of stones, of dust, of blood, and even of living animals. The historians of every quarter of the globe have furnished instances of this kind, but they are not always to be regarded as accurately representing the fact, and therefore in this brief record we shall divest them of their fabulous character, and present them as they are believed to have actually occurred, and even then they are sufficiently wonderful.

There are two natural methods by which it is obvious that stones and dust in large quantities may fall in certain places. The first has to a greater or less extent come under the observation of almost every one. A hurricane, or powerful wind travelling at the rate of eighty miles an hour, will often tear up by the roots huge trees, take away the tiles from the roofs of houses, and lift stones and dust into the air, and it may therefore be equally capable of conveying portions of them to considerable distances, and then dropping them. Another, and which in all probability is the most usual, as well as the most powerful, is the eruption of volcanos.

The burning mountains cast up a vast quantity of stones, ashes, cinders, and fine dust, to an immense height in the air, and these, owing to their light nature, are carried away vast distances by the powerful winds which prevail during the eruptions, and falling in places far away from the volcanos are readily supposed, by those who are unacquainted with their origin, to proceed directly from the clouds. There are well authenticated accounts of the ashes from Mount Vesuvius having been carried, thirty, forty, and even fifty leagues, a distance equal to one hundred and fifty miles. During powerful winds from the south, the sand of the desert of Sahara has been carried across the Mediterranean as far as Sicily, and even to the sea-coast towns of Italy.

The accounts of blood-rains are simply fabulous, but they have had their origin in certain phenomena which while it has not justified has nevertheless afforded sufficient pretext for such vagaries. A very remarkable instance of this kind is described by Swammerdam. He tells us that one morning the whole town was in an uproar, on finding their lakes and ditches full of blood, as they thought, and having been certainly full of water the night before, they agreed it must have rained blood in the night; but a certain physician went down to one of the canals, and taking home a quantity of this blood-coloured water, he examined it by the microscope, and found that the water was water still, and had not at all changed its colour; but that it was full of prodigious swarms of small red animals, all alive, and very nimble in their motions, whose colour and number gave a red tinge to the whole body of the water they lived in. The certainty that this was the fact, did not however induce the Hollanders to part with their miracle: they concluded that the sudden appearance of such a number of animals was as great a prodigy, as the raining of blood would have been, and that this portend foretold the scene of war and destruction which Louis XIV. afterwards brought into that country, which had before enjoyed forty years of uninterrupted peace. At another time we have accounts of a red-coloured rain falling at Blankenbury and Dixmudi, in Flanders. The same thing happened at Scheveningen. This red water, however, was analyzed, and found to owe its origin to the presence of a chemical substance called the hydrochlorate of cobalt, and not to blood, as was thought to be the case by the ignorant and superstitious. There has happened occasionally a species of *black* rain, a phenomena of very rare occurrence. A fall of this kind took place at Montreal, in America, which is thus described. The dark and thick weather which was experienced in this city, some time back, extended throughout the United States, as well as the neighbouring provinces. In the district of Maine—now of liquor-law notoriety—the darkness was very great at times, during which there were occasional peals of thunder, and very vivid lightning. The appearance of the firmament was awfully grand and terrific, which gave rise to the most fearful apprehensions in the minds of many persons. In Montreal also the darkness was very great, particularly on the Sunday morning, when the whole atmosphere appeared as covered with a thick haze, of a dingy orange colour, during which time rain fell of a *dark inky appearance*, and apparently impregnated with some black substance resembling soot. On the succeeding Tuesday there followed a slight shock of an earthquake, accompanied with a noise resembling the distant discharge of artillery. It was now that the increasing gloom attracted universal attention. At twenty minutes past three, when the darkness seemed to have reached its greatest depth, the whole city was instantaneously illuminated by the most vivid flash of lightning ever witnessed in Montreal, immediately followed by a peal of thunder so loud and near as to shake the strongest buildings to their foundation, which was followed by other peals and accompanied by a *heavy shower of rain of the colour above described.* About 4 P.M. the heavens began to assume a brighter appearance, and the consternation which had filled the whole city and neighbourhood gradually subsided.

Occasionally we hear of falls of *red snow*. These occur in the Arctic regions, and appear to be owing to the presence of *oxide of iron*, in a state of minute division, and also to a resinous vegetable principle of an orange-red colour, belonging apparently to some lichen, of which too, perhaps, the iron may form one of the immediate principles.

The lovers of the marvellous have given us frequent accounts of the *raining of frogs*, and this is supposed to have happened so often that there are multitudes who pretend to have been eye witnesses of such rains. These rains of frogs always happen after very dry seasons, and are much more frequent in the hot countries than in cold ones. In Italy they are very frequent; and it is not uncommon to see the streets of Rome swarming both with young frogs and toads in an instant after a shower of rain; the frogs hopping every where between the people's legs as they walk, though there was not the least appearance of them before. Nay, they have been seen to fall through the air down upon the pavements. Theophrastus, the greatest of all the naturalists of antiquity, has affirmed the same thing. It would appear, however, that these occurrences exist rather in the imagination, than in nature, and may be put down as a simple stretch of that elastic and creative faculty. That Theophrastus and others believed this delusion there can be no doubt, in which fact we may see evidence of the possibility of imposing upon the learned and scientific, as well as upon the ignorant and superstitious. Signor Redi dissected some of these said-to-be newly fallen frogs, and found in their stomachs herbs and other half-digested food; and openly showing them to his credulous countrymen, asked them if they thought that Nature, which engendered according to their opinion these animals in the clouds, had also been so provident as to engender grass there for their food and nourishment.

The raining of fish has been a prodigy much talked of in France, when the streets of a town, at some distance from Paris, after a terrible hurricane in the night, which tore up trees and blew down houses, were found covered with fishes of various sizes, and these were supposed to have come down from the clouds; but the more enlightened portion of the population accounted for the fish-rain in another way, when they found that the water of a fish-pond, which stood on an eminence in the neighbourhood, had been blown dry by the hurricane, and only left the great fish at the bottom of it, the small fry having been swept into the streets.

PETER BOTTE MOUNTAIN.

Few of the eminences of the earth merit more attention from the student of Geology, or the lover of the strange and wonderful, than the curious conical peak which rises up in the island of Mauritius, and which bears the name of Peter Botte Mountain. The island of Mauritius is better known at the present day for the vast imports of sugar we receive from thence, and few of the British colonies exceed it in the amount of their trade and produce. The situation of the island is off the east coast of Africa, the great island of Madagascar lying between it and the mainland. The soil is rocky, and evidently the result of volcanic formation; the mountain we are now describing owing the chief features of its shape and size to its volcanic origin. Bold, wedge-shaped, and formed of an assemblage of huge boulders, and shapeless fragments of the hardest rock, it looks like the work of a race of giants, who, in the age of fable, may have flung these blocks together in their sport, or have piled them up into a ladder, on the top of which they would confront the eagle, and bid defiance to the morning star. The aspect of the mountain is wild and singular in the extreme. It has no surrounding ramparts, no dykes, cliffs, or chasms, but rises out of the plain to a height of 1800 feet, a conical and isolated hill, formed of immense blocks of granite, many of which seem threatening, every instant, to precipitate themselves into the fertile plain below.

To reach the top of this mountain has been the desire of many. One adventurer is said to have climbed to the top some years ago; but having had the misfortune to roll from the summit to the bottom, he did not survive to recount his adventure. This was the supposed Peter Botte, from whom the mountain takes its name. Some sixty years since, a Frenchman boasted of having made the ascent and descent in

PETER BOTTE MOUNTAIN.

safety, but he was belied for his pains, and the top of the mountain was still regarded as inaccessible.

In 1831, Captain Lloyd, civil engineer, accompanied by Mr. Dawkins, ascended the mountain, and got as far as the part called the Neck, which may be seen in the engraving, about half way up, at the foot of two immense adjoining rocks. Captain Lloyd, however, was convinced that the summit might be reached, and accordingly, on the 7th of September, 1833, he made another attempt, in company with Lieutenants Phillpots, Keppel, and Taylor.

The arrangements included a staff of twenty sepoys, several negros carrying food, and a necessary supply of ropes, ladders, and engineering implements. Along a path not a foot broad, they picked their way for some hundred yards, and at last stood on the little patch of land, called the Neck, which only measures 20 yards. Here the scene was most sublime. One extremity of the Neck was precipitous, and bounded by a narrow knife-like edge of rock, broken here and there into precipitous faces, and running up in a conical form to about 350 feet above them; while on the pinnacle above, the great crowning mass of stone, called "Peter Botte," frowned sublimely upon them.

At this Neck was found the ladder which had been used by Captain Lloyd and Mr. Dawkins in 1831; and this was the first engine in the work of scaling the top. A negro boy ascended the ladder, and then climbed some distance up a cleft in the rock, carrying a cord round his middle. The line was made fast, and the boy cried, "All right!" Away up the face of the slippery rock scrambled the four adventurers, the ascent, even here, being fraught with the utmost danger, and the least false step, or crumbling of the rock, being certain to precipitate them into the plain below. Here sat Lieutenant Taylor astride a sharp ridge which commanded both sides of the mountain, so that he could kick his right shoe into the plain on one side, and his left shoe into the ravine on the other.

The next step was to scale the head of the mountain; but the question was, how to get a ladder up against the projecting edge of the upper rock. Captain Lloyd had provided some iron arrows, and having a gun, he made a line fast round his body, to which the other three held on, and going over the edge of the precipice on the opposite side, so as, in fact, to lean over the side of the precipice, bearing his whole weight on the rope held on the other side by his companions, he fired several arrows over the crowning rock, but without succeeding in getting over the rope. If the line had broken at this moment, he would have met with Peter Botte's fate, and have fallen 1800 feet. Then he tried to throw over a stone, attached to a line, but the line would not catch, and away went the stone into the chasm below. At last a shift of wind occurred, and Lloyd flung a stone, with the assistance of Æolus, and away it went over the rock, and safely carried the line with it.

The rope being caught by Lloyd's companions on their side of the rock, was then made the medium for drawing up a ladder, the foot of which was securely lashed against the base on which they were standing. Away went Lloyd, followed by his three faithful satellites, all hallooing and scrambling, and the top of the Peter Botte was reached. The union-jack was unfurled, and recognised by the shipping in the harbour, and greeted with a grand salute, which the adventurers returned with their gun. A bottle of wine was then hauled up, and the rock christened King William's Peak, while the health of the king was drunk with all the honours.

Determined not to do things by halves, arrangements were made for sleeping on the top. Blankets, pea-jackets, and the necessary refreshments were hauled up, and in the meantime dinner was prepared by the negros on the shoulder below. After dinner, as darkness came on, they re-ascended to take their repose. "It was a glorious sight," says Lieutenant Taylor, "to look down from that giddy pinnacle over the whole island, lying so calm and beautiful in the moonlight, except where the broad, black shadow of the other mountains intercepted the light. Here and there, we could see a light twinkling in the plains, or the fire of some sugar manufactory But no sound of any sort reached us, except an occasional shout from the party down on the shoulder. At length, in the direction of Port Louis, a bright flash was seen, and after a long interval, the sullen boom of the evening gun. We then prepared our pre-arranged signal, and whiz went a rocket from our nest, lighting up for an instant the peaks of the hills below us, and then leaving us in darkness. We next burned a blue-light, and nothing can be conceived more beautiful than the broad glare against the over-hanging rock. The wild-looking group we made in our uncouth habiliments, and the narrow ledge on which we stood, were all distinctly shown; while many of the tropical birds, frightened at our vagaries, came glancing by in the light, and then swooped away, screeching, into the gloom below; for the gorge on our left was dark as Erebus."

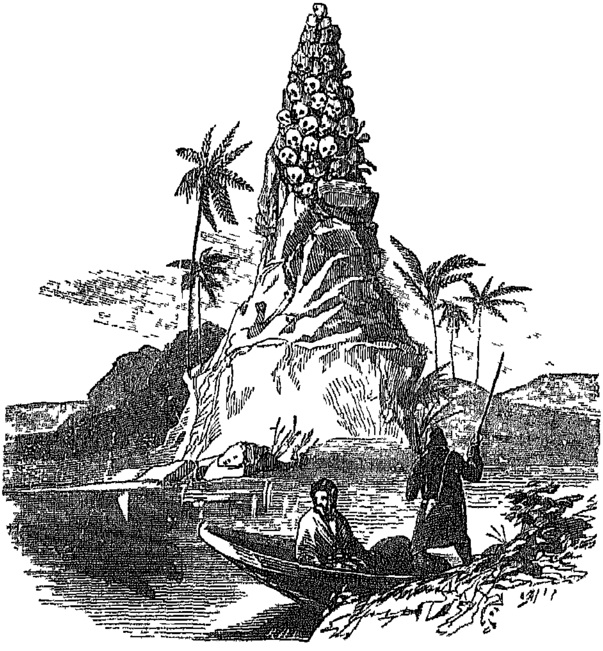
Next morning, our adventurers found themselves stiff, cold, and hungry; and after fixing a twelve-foot ladder on the summit, and crowning it with a water barrel; and above all, a long staff bearing the union-jack, they bid adieu to this uncomfortable, but romantic resting-place, and effected a safe descent to the bottom. Regarding the expedition as an amusing, though daring experiment, it must be pronounced one of the most brilliant ever achieved.

THE TOWER OF SKULLS,

IN THE ISLAND OF GERBA.

TUNIS, a Barbary state in the north of Africa, has been tributary to Turkey for many years, and is governed by a council of state with a Dey at its head, who has the power of levying taxes, a definite portion of which he remits to the Sultan. From time immemorial the governorship was vested in the family of the Bernaiaths, who plundered the inhabitants and profited largely by the appointment. The late Sachab Ettaba contrived a scheme for the humiliation of the presiding Bernaiath; and having raised himself from the condition of a slave to that of prime minister to the Bey, he conceived nothing more admirable than to empty the coffers of the governor of the island, and transfer his wealth to his recent master. One of the spots he visited was Gerba, and after feasting his eyes on the display of magnificence, returned to Tunis, and ordered the governor of Gerba to appear before him. "You have shown some dexterity in transferring thy master's substance into thine own chests," said he; "thou hast built thyself houses, and set them off in costly array, whilst our lord and master was in actual need, and hast well deserved to be hung up and have thy property taken from thee: but out of pure friendship I will make thee a present of thy life, it being understood that thou payest two millions of piastres into the treasury forthwith, and never venturest to set foot in Gerba again."

The first part of the condition was fulfilled without demur, but the Bernaiaths were too proud to consent to the other. A negotiation was therefore set on foot with the exasperated minister, and pursued with unremitting ardour until he was brought to relent. The disgraced governor was restored to favour, and confirmed anew in his post at Gerba; but under the control of a council of ten of the inhabitants without whose sanction he was prohibited from levying any dues or imposts. Such is a sample of the sort of government which prevails in Turkey, where robbery and assassination have long been held by princes, and men in power, as the best instruments of justice.



THE TOWER OF SKULLS.

The Moors who inhabit Gerba are refined, prosperous, and on the best terms with the Christians in and around the place. Such unhappily has not always been the case, and at *one time the most deadly hate was encouraged by the Mahommedans* against those whom they decreed their enemies in religion. During the last contest between the Spaniards and the Moors, eight hundred of the Christian warriors threw themselves into a fortress, and there defended themselves gallantly against the exasperated Gerbese. The Moors made several attempts to take it by storm, but were always driven back with considerable loss, and three of their leaders were killed, while not a single Spaniard had been injured. But the scourge of those who besieged now overtook them, and they were famishing for want of food. The daily rations were served in small portions, and failing at last, the little band of brave warriors were perishing of want of food. They looked out from their stronghold day by day, in hope of succour, but none arrived. Already fever was among them, the low purpureal fever, that follows in the wake of famine. They capitulated with the Moors, and surrendered on condition that their lives should be spared, and an unmolested retreat was promised them. Scarcely, however, had the Moors become the masters of the fortress than they brutally butchered the eight hundred unarmed and yielding adversaries; and after slaughtering every individual of them, collected all their bones and skulls, and erected them into a monument on the sea-shore, a memento of their own barbarity and of the fierce hatred which they fostered against the Christians.

The monument has remained ever since, and from time to time has been washed with colour to render it more horrifying and ghastly. The Moors who fell in this fierce and sanguinary struggle lie interred in the vicinity of the Tower of Skulls, and from the number of their graves, it appears that the number of these heartless wretches who perished in the last onslaught on the brave Spaniards was considerable. A chapel has been erected over the graves of three of their leaders.

At the present day the Tower of Skulls is one of the chief objects of attraction to tourists and strangers, to whom, as they view this memento of Moorish perfidy, the grey bones seem to say—"Depart pilgrim, depart and seek your Christian brethren, and tell them that we have, for whole centuries, endured this thrall, and found no abiding place for our bones. Haply the sound of thy voice may reach the ear of some goodly prince, and our bones may be deposited within the soil that gave us birth."*

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* Ewald's "Missionary Travels."

QUEER STOMACHS.

SOME years ago (about 1804) an English sailor commenced a series of feats of a very novel, though disgusting, kind. In itself the performance of this man merited severe punishment, for we hold any abuse of the body as criminal; yet, owing to the light thrown on the digestive power of the stomach by this man's freaks, the incidents, however repulsive, otherwise acquire a scientific interest. It was thought wonderful when, not many years since, the celebrated conjurer Ramo Samee passed a keen sword down his throat, and withdrew it safely, in the presence of a public audience; but this sailor (whose name we cannot remember) actually *swallowed* clasp-knives, and swallowed them too in considerable number. He began in this, as people begin in most things, "by degrees." In a drunken frolic he swallowed a clasp-knife, and no serious effects following, he became emboldened, and swallowed another. In each case the handles of the knives were thoroughly digested, and the bone dissolved by the action of the gastric fluid; the steel blades passing without serious injury.

Sailing from Portsmouth, he went to Boston, United States, and there he made an exhibition of his strange qualification, and swallowed at different times as many as fifteen knives. It was not, however, without risking his life, that he proceeded in this abandoned manner, and he was taken to an hospital in a desperate condition, where every means were used to bring away the knives, which was at last accomplished safely. He then sailed for France, and then embarked in another vessel for America. On the passage the ship was taken by the English ship Isis, under suspicion of being engaged in smuggling, and the knife-swallower was pressed into the English service. One day, while the ship lay at Spithead, he, with other of his companions, got intoxicated, and his performances became the topic of conversation. He was pressed to repeat the experiments, and in the course of that night he swallowed five knives. The next evening he was again pressed by the ship's company to repeat his experiment, and readily complying, swallowed, with the assistance of drink and the encouragement of the crew, as many as *nine* clasp-knives, some of which were very large. In this business he got so completely intoxicated as at last to become oblivious of what was going on, and in his drunken condition swallowed *four more* knives. This was his last attempt; he was seized with violent spasms, fever and mortification followed, and in a few days he was a corpse. On the inspection of his stomach it was found that many of the knives were partly digested, and some few were freed entirely of their bone handles, which the gastric fluid had dissolved, while the steel blades were corroding and festering in the delicate parts of his insulted stomach. He had swallowed in all thirty-five knives.

A similar incident, which occurred at Puy de France, is described in the *Gazette des Tribunaux:* A person named Rupin, on entering a *café*, said, "Gentlemen, I am a physiognomist, and can, from an examination of the face, describe the character and future lot of each of you." A tradesman, M. B., requested him to examine his face, which he did with great apparent attention. "I see," said he, "from the protuberances on your forehead, that you have great aptitude for works of imagination. You are naturally good, but do not like to be offended. A person in whom you feel interest is now writing to you, and you will soon receive a considerable sum on which you do not calculate." He next made an examination of other people's faces, and talked in the same vague way. He afterwards presented his cap, and collected the gratuities of the company. "Waiter!" he then cried. "What shall I serve you, sir" "Some flints." A plate full of flints was brought in, and he swallowed five with a good deal of apparent appetite. "I also like five-franc pieces," he observed, "and if any one will be kind enough to give me one, I will swallow it!" This proposition was received with silence; and at last M. B—— said, "It is easy enough to swallow a piece of 5f., and I know a good many people who have devoured all their fortunes. But you could not swallow a watch, I am sure." "I will do so, sir, with great pleasure. Give me yours, and you will see!" "There it is." The man took the watch, which was in silver and of a good size, and swallowed it with ease. After a moment of surprise and admiration, M. B—— observed, "It is very clever, certainly, but when will you give me back my watch?" "Never!" "O, that is too much; I did not mean to make you a present of it!" "But I thought you did. Besides, could you suppose that I would swallow a watch for nothing? We played a game—you staked your watch, I staked my life. I am not yet in safety—the watch may break in the process of digestion." "But, sir——" "Possession is a good title in law, and I possess. And, besides, how can I give up the watch? Am I to rip myself up?" "O, no: but I will wait."

"Wait if you will, but you shall not have your watch." The tradesman took the man before the commissary of police, but that functionary, after hearing all the facts of the case, declared that he was entitled to the watch.

HOW ANIMAL FOOD CAME FIRST TO BE EATEN.

PORPHYRY, in his remarkably learned work on "Abstinence from Animal Food," among other queer items of old-world gossip, gives a story to illustrate how it was that animals first became a part of the human dietary. He says, that in the primitive or golden age of human history, men sustained themselves on the simple vegetable products of the earth; their chief food being acorns, nuts, and fruits. At this time also it was deemed sacrilege to kill an animal of any kind, and herbs only were used in sacrifices. In all religious ceremonies an altar of wood was bound round with fillets of grass and fruits, and flowers and green vegetables offered upon it in sacrifice to the gods. But afterwards, when a long drought occurred, and no fresh vegetables were to be had for sacrifice, a priest spilt the blood of an animal on the altar, and from that time animal sacrifices became common. Still, though animals were slain in the temples, it was considered irreligious for any one to eat them, and abstinence from flesh prevailed as in former times. Upon one occasion, a certain priest, while officiating at the altar, engaged in arranging the victim on the burning embers, scorched his fingers with the fire, and while his fingers smarted with the pain, he popped them into his mouth for relief, as people are in the habit of doing when their fingers are suddenly pained. This act caused him to taste the flesh of the roasted lamb, some of which adhered to the burnt fingers, and being delighted with the flavour, he afterwards secretly ate of some of the roasted sacrifice. Discovered in the commission of this crime he was punished with death; but after a certain time another priest met with the like accident, and tasted flesh in the same way. This latter possessed more ingenuity than the first one, and to evade the punishment which he knew must be awarded him, he immediately made an appeal to the appetites of the people, and so fully persuaded them that it was right to eat as well as sacrifice animals, that the practice of eating animal food soon became common; and in spite of all the remonstrance, persuasion, and denunciation of anchorites, has survived as a deep-rooted habit to the present day.

IMPUDENCE OF A QUACK.

The public are sufficiently acquainted, by means of newspaper advertisements, and the prosperity of undertakers, with the general tendency and character of modern quackery. But the quackery of to-day, though more destructive in its operation, because furnished with more effective weapons for its warfare against humanity, than the quackery of olden times, is nevertheless, much less audacious, much less original, and if we may use the term without degrading it, less imbued with *genius* than formerly. One instance, out of many which might be cited, will show to what extent the pretensions of quacks have gone, and how, in times of ignorance, the most preposterous of promises obtained credit and pay.

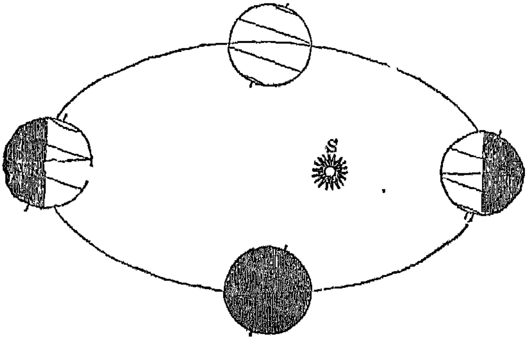
The most famous charlatan of his day was Mantaccini, a Parisian spendthrift, who, having wasted his patrimony, determined to levy contributions on the unwary, by appealing to their credulity. He set out by announcing that he could cure any diseases *by a touch or look.* Under the *prestige* of this announcement he set up a splendid equipage, and styled himself the "celebrated Dr. Mantaccini." Not succeeding as he wished, he took a bolder flight, and leaving Paris, entered Lyons, where he announced himself as the "celebrated Dr. Mantaccini, who revives the dead at will."

The dead, however, not caring to seek his assistance, and the living shunning his miraculous powers, he made the highest flight of impudence on record, and declared that in fifteen days he would proceed to a certain churchyard, and revive all the dead, however long they might have lain there. He was sneered at for his pains, but nothing daunted, he went to a magistrate and desired to be placed in custody till the time should arrive, so that the citizens might remain assured he would not fly from the place to avoid the persecution which the failure of his pretensions might entitle him to. This step turned the tide in his favour, and the city became excited and alarmed. Crowds flocked round him for advice, and fees rolled into his pockets. As the time approached, the excitement increased, and numerous of the citizens waited on him to beg he would leave their deceased friends and relatives to sleep as heretofore. Two dashing beaux implored him not to raise their old father, who would, *if awakened, disinherit them ;* these offered him sixty *louis* for his promise to let the old man remain in his grave, which the doctor accepted with a reluctant shake of the head. From dawn till dusk he was visited in this way, and enormous sums were paid him to refrain from reviving certain parties, such as the wives of husbands who had married again; husbands of widows who were again proceeding to the altar; impoverished persons, whose means, obtained by fraud from the living, or by forgery after death, the supplicants were still enjoying, and hundreds of others whom the survivors wished, for innumerable reasons, to see no more. At last the chief magistrate of the city waited on the quack, and begged him to allay the fearful excitement into which the city was thrown by the expectation of the miracle; begging him to go away, and giving him an attestation, duly sealed, *that he could revive the dead at will*, and that it was the fault of the citizens that they did not behold so sublime an exhibition of his talents. He returned to Paris loaded with gold, and laughed at the credulity of his liberal dupes.

ICEBERGS.

> "Here Winter holds his unrejoicing court;
> And through his airy halls the loud misrule
> Of driving tempests is for ever heard;
> Here the grim tyrant meditates his wrath;
> Here arms his winds with all subduing frost;
> Moulds his fierce hail, and treasures up his snow."
> THOMSON.

In our temperate zone, changeable as is the climate, and bleak sometimes the seasons which should be warm, we yet know nothing of the rigour which prevails in regions nearer to the Pole, where a winter of many months and a summer of a few weeks constitutes the entire circle of seasons. There is something inexpressibly awful to one who sees the sun shine for twelve months in the year,—even if November has fogs and February frosts,—in the contemplation of those frozen regions of sterility, where ice and snow are the only elements of the landscape, and even the blade of grass perishes in the lack of the little warmth needed for its sustenance. In other points of view these silent solitudes of ice and snow are invested with a deep interest, and of late years human sympathies have most strangely tended thitherward. On account of the public anxiety in regard to the fate of one of our ablest and most energetic navigators, the loss of Franklin and his crew is now becoming so strong a probability, that we look northwards with less hope than of yore; but up to the present time the flame of hope has been fanned in the hearts of many, and numerous expeditions have been equipped to search the most probable localities of the missing ships, though in each case, as is well known, with a most painful result. Independent of the strange interest which attaches to these scenes, the events just referred to lend an additional attraction, and it seems seasonable as well as appropriate for us to say something here of the nature of the northern ice-fields.

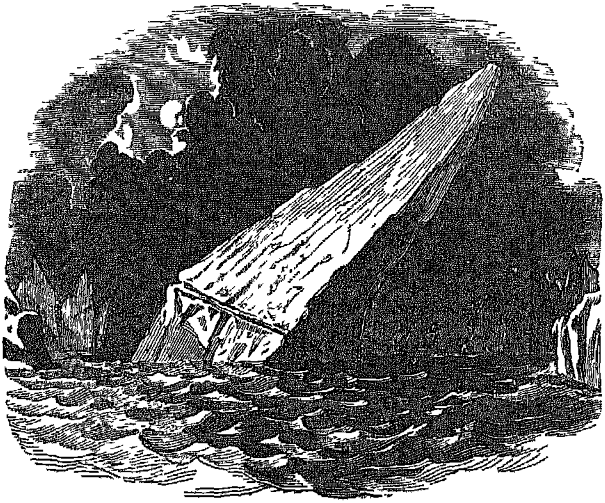


THE SEASONS.

The great ice formations of the poles are due to the globular form of the earth, and the obliquity of its axis. If the axis of the earth were either parallel or at right angles to the plane of its motion, a diversity of climate would prevail over its whole surface, but in every region the climate would be constant throughout the year. But as the axis of the earth is inclined to the plane of its orbit, at an angle of 23½ degrees, the north and south poles are alternately turned towards the sun and away from it, and hence the seasons with their manifold varieties flow from this poising of the poles.

By this illustration it will be seen that in March and September the sun's light reaches equally from pole to pole; but in June the North Pole is warmed and lighted, and in December it is enveloped in darkness, while the South Pole enjoys summer in its turn.

Thus the intense cold during many months at the poles is owing to the absence of the sun's rays, and during the long season of winter the fresh waters and the seas get frozen considerably below the surface, and when the sheets of ice thus produced are broken by the succeeding summer, huge blocks of disengaged ice float on the surface, and constitute, in one case icebergs, and in the other, immense fields of sheet ice.



A WONDERFUL ICEBERG.

In high northern latitudes, as early as the month of August, snow beings to fall, and a formation of ice rapidly ensues. The hoar-frost covers with fantastic clusters every prominence on land, and the frost-smoke appears upon the sea, giving it the aspect of a vast steaming lime-kiln; the vapour being produced by the temperature of the water being relatively higher than that of the incumbent atmosphere. The fresh water poured from rivulets, or drained from the former collections of snow, becomes quickly congealed along the shores and bays, and the surface of the ocean is converted into one solid mass of ice for some distance from the coast. As early as the middle of September, Captain Parry found the Bay of the Hecla and Griper, in north latitude 74° 44′ 20″, so completely covered with ice, that his men were obliged to open a canal with saws to admit the ships, an operation which occupied them three days, during which they cut through more than two miles of new ice, the average thickness of which was seven inches. The sun left them on the 11th of November in a scene of death-like stillness, surrounded by a waste of frozen waters without the flutter of leaf or wing to break the dreary desolation.

> "How drear and awful is this solitude!
> Nature herself is surely dead, and o'er
> Her cold and stiffen'd corse a winding-sheet,
> Of bright unsullied purity is thrown."

In this position, the atmosphere was so calm that their voices could be heard at the distance of half a mile; darkness prevailed during the whole twenty-four hours, and the sun was not seen again till it had been absent eighty-four days. Upon the return of the sun, the bonds which connect the masses of ice with the land are dissolved, and the ice itself —broken by storms and currents into fragments of every size and shape—is set loose upon the surface, and a scene of horrible confusion ensues.

The current from the North Pole at first sets to the south-west, and carries with it immense sheets of ice between Iceland and Greenland. Then, deviating towards Davis's Straits, it descends upon the shores of Labrador and Newfoundland, and reaching the centre of the Atlantic, is lost in the gulf stream. This is the current that brings the ice southwards, far from the place of its birth, to be rapidly dissolved by the warmer water and atmosphere of a more genial climate. The dispersion of a vast body of polar ice in 1817 gave rise to the first of the expeditions of the present century to effect a north-west passage to America; but though the accumulations of four centuries were then scattered on the seas and drifted to the shores of Europe, it was found, in the experiences of the expedition, that the rigour of the climate had not in the least abated.

There are two kinds of ice-formations—one consists of sheet ice, which has been formed on the surface of the sea itself, and forms what are termed *ice-fields*. These have sometimes an area of more than a hundred square miles, and rise above the level of the sea from two to eight feet. The effect of ice rising above the level of the water in which it floats is owing to its being lighter than the water from which it was frozen, a large body of air being embodied in it during the freezing process. A piece of ice, though of considerable size, which can be distinguished in its extent, is called a *floe*, and a number of pieces attached together, and stretching out in any particular direction, is called a *stream*. For many years past the annual loss of ships engaged in whaling has been about four in the hundred; the losses being chiefly occasioned by the dangers of the ice-fields and floes, which move with such force as to crush every object in their way, and when meeting together crash into a thousand pieces, with the most fearful concussions.

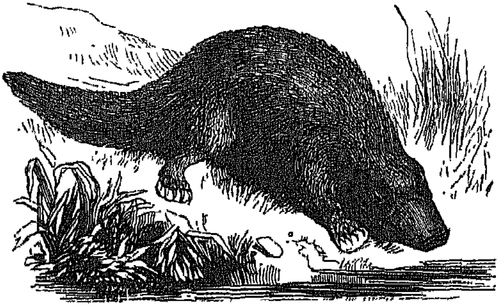
Dr. Sutherland, in his narrative of the recent voyage in the ships Lady Franklin and Sophia, under Captain Penny, thus describes the tidal agitation of the iced waters: "Floe presses against floe; corners are broken off and overlapped; hummocks and ridges are raised in all directions; blocks of ice of all shapes, sizes, dimensions, and weights, from one to twenty, and even sixty tons, are raised up as it were by an 'unseen power.' Huge icebergs of, perhaps, five hundred millions tons weight, plough up floes for miles and miles without being checked in their destructive course. Nothing is to be seen but ice, 'living ice,' in slow but sure and steady motion, and the surface, which an hour previously presented a level plain of pure white, with pools and meandering lanes of the blue sea, is now one complete wreck; the colour is changed to a mixture of a dirty white and blue, the evenness of the surface is destroyed by masses twenty feet above its former level, and a square foot of open water cannot be seen for many miles around."

The great distinctions of icebergs from sheet-ice is that they are fresh-water formations, and are identical with the Glaciers of the Alps. They are masses projecting to a great height from the surface of the water, and have the appearance of chalk cliffs sailing on the deep. An elevation of two hundred feet, and a circumference of two miles are dimensions they frequently assume. An iceberg which Captain Parry's party ascended was found to be four thousand one hundred and sixty-nine yards long, three thousand eight hundred and sixty-nine yards broad, and fifty-one feet high, being aground in sixty-one fathoms of water. Its appearance was like the back of the Isle of Wight, and the cliffs resembled those of the chalk range to the west of Dover. The weight of this mass was calculated at 1,292,397,673 tons. One examined by Captain Graah, on the east coast of Greenland, rose one hundred and twenty feet out of the water, and had a circumference of four thousand feet at the base, the solid contents being upwards of nine hundred millions of cubic feet. In Dr. Sutherland's narrative occurs the following fine picture of one of these floating ice-islands: "A great many icebergs were seen as the ships lay motionless in the water; and as they appeared to run together on the far distant horizon, an idea arose that they were so close that no ships could pass between them. Some of them were in the form of large square cubes, with flat and horizontal tops; others, again, presented every variety of form, now resembling cities and villages, now ruins; and, again, you might imagine one to be a solitary country church, in the modest Gothic style, rising beautifully above the level plain, on the distant horizon, and adding a sacred charm to everything around it; some appeared to be loaded with huge boulders and mud, shortly to be precipitated into the sea which bore them along; while others were yielding themselves submissively to the wasting influence of the sea, and the powerful rays of the sun. There was one iceberg which was particularly noticed, because it never shifted its position, when others, of rather larger size, were drifting to and fro with the tides. It was about two hundred feet in height above the surface of the sea, and its perpendicular sides, which were nearly equal, were not less than two miles in length. The upper surface was horizontal, but very irregular, appearing as if it had been planted over with rough and irregularly conical eminences packed closely together, and varying in height from twelve to twenty or thirty feet. The water lines at the level of the ice around it were also horizontal. There seemed to be no reason for any other opinion than this, that it had never changed its centre of gravity since it descended into the sea, and had become detached from the glacier which gave it birth. The cubic contents and weight of such a floating world are truly astonishing. This berg displaced upwards of eighteen thousand millions of cubic feet of water, while its contents must have been nearly twenty-three thousand millions of cubic feet, and its weight nearly five hundred and forty millions of tons."

Equally imposing, by its grandeur, to the inundations and avalanches of the Vistula and the Danube is the breaking up of one of these icebergs, which frequently occurs in the southern parts of the Arctic seas.

"When an immense iceberg," says Dr. Sutherland, "begins to tumble to pieces and change its position in the water, the sight is really grand—perhaps one that can vie with an earthquake. Masses inconceivably great, four times the size of St. Paul's Cathedral or Westminster Abbey, are submerged in the still blue water to appear again at the surface, rolling and heaving gigantically in the swelling waves. Volumes of spray rise like clouds of white vapour into the air all round, and shut out the beholder from a scene too sacred for eyes not immortal. The sound that is emitted is not second to terrific peals of thunder, or the discharge of whole parks of artillery. The sea, smooth and tranquil, is aroused, and oscillations travel ten or twelve miles in every direction; and if ice should cover its surface in one entire sheet, it becomes broken up into detached pieces in the same manner as if the swell of an extensive sea or ocean had reached it. And, before a quiescent state is assumed, probably two or three large icebergs occupy its place, the tops of some of which may be at an elevation of upwards of two hundred feet, having, in the course of the revolution, turned up the blue mud from the bottom at a depth of two to three hundred fathoms."

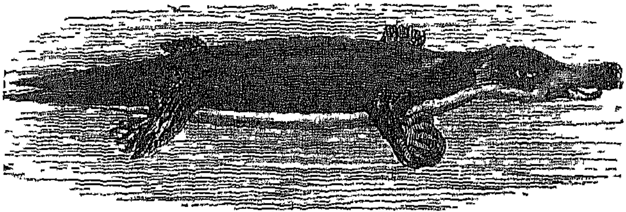
LINKS BETWEEN QUADRUPEDS AND BIRDS.



THE PLATYPUS.

Among the wonders brought to light by the early adventurers in New Holland, was an animal which excited more wonder than any similar discovery during many years previously or since. That region indeed was full of wonderful forms, and strangely, most of the animals and vegetables were of such strange comparatives as to form connecting links between important sections of their respective departments of nature. The Kangaroo and Opossum for instance, connected the mammalia with the birds and reptiles, inasmuch as that its young are produced in a half-formed state, more in the state of half-hatched eggs, than in the ordinary complete state of quadrupeds. But another creature was found of still more remarkable structure, named the *Ornithorhyncus*, or duck-billed platypus. Nowhere but in the Australian continent and Van Dieman's Land was this creature found, and the strange anomalies of its organization seemed to mark it most specially as the product of that strange and *exceptional* region.

The *Ornithorhyncus* (so named from its *bird*-like *bill*), is an animal of such extraordinary aspect, that the specimen first brought to this country, at the end of the last century, was supposed to have been *made up*, by the attachment of the beak and feet of a bird to the body of an otter-like quadruped. It was not until other specimens had arrived, and had been submitted to most careful examination, that naturalists were satisfied of the real existence of such an animal. Since that period, its true place in the scale, depending upon the mode in which it produces and nourishes its young, has been a most fertile source of controversy; but the question may now be regarded as set at rest by the inquiries of Professor Owen, who has discovered its real mammalian character, and arranged it in an order called Monotremata.



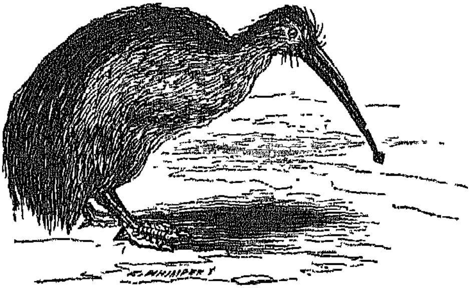
PLATYPUS SWIMMING.

Dr. Shaw describes it as being covered with a short thick fur, dark brown above, and reddish white underneath. The mouth or snout so exactly resembles that of some species of broad-billed duck, that it might be mistaken for such: the tail is flat, furry, and obtuse, and about three inches in length. The legs are very short, and the feet terminate in a broad web, which on the fore-feet reaches to a considerable distance beyond the claws; but on the hind-feet no further than the roots of the claws. There is no appearance of teeth; and the mouth in every respect resembles that of a duck.

Here then is a creature possessing the attributes of the duck and the quadruped, and we have only to wait till it takes water, to see that something of the fish belongs to it also.

When alarmed it takes to the water immediately, and dives with great address. Eel-like it glides along, duck-like it seeks its food in the mud on the banks and bottoms of the streams, and quadruped-like it produces its young alive, and suckles them. Its whole organisation is evidently designed to adapt it for seeking its food in the water, and for chiefly inhabiting that element; and what is known of its habits fully confirms this view. It burrows in the banks of rivers, and seeks its food in precisely the same manner as the duck. River insects, small shellfish, and water-plants, appear to constitute its nourishment.

So far the bird and the mammal are linked together by a creature endowed with striking features peculiar to both. But mark, the Platypus is at last a mammal or true quadruped. To bring the two departments still nearer together, Nature will produce the same anomaly in the bird kingdom, as we have just witnessed in the mammalian. Here is a creature of the bird kind which puzzles us as much as the Platypus, and seems to possess almost equal claims to each of the respective divisions. Is it a bird? It has the look of a bird, but if we examine its structure, we shall see few of the bird attributes. The true bird has no diaphragm, that is, the membrane or muscle which separates the chest from the abdomen, but this creature has the diaphragm complete. The true bird has hollow bones and numerous air-cells in various parts of its body, in order to render it of less weight for flight, and maintain energetic vitality under the trying circumstances of flight. The Apteryx has solid bones and no air cells, and is so strangely fitted up in this respect as to be utterly incapable of the very bird-like faculty of flying. It has a bill which is truly ornithological, but it has no wings, or rather it has rudimentary joints where wings should be, each of which is terminated by a hook, as if hands would some day grow there; and these hooky appendages it flaps about with as much pride as if they were eagle's pinions, and now and then finds them of real service in its own defence. Lastly, it is destitute of the first estate which an ordinary observer would expect a bird to have: it has no feathers, but is covered from head to stern with shaggy hair, so as most effectually to shut itself out of the society of all feathered bipeds in a world where the cut of the garments is an universal certificate. The size of this bird is about that of a domestic fowl, and its colour a deep brown. It runs with rapidity, and defends itself vigorously with its feet. It is nocturnal in its time of action, and subsists on insects. Its native name is *kivi-kivi*, derived from its cry.

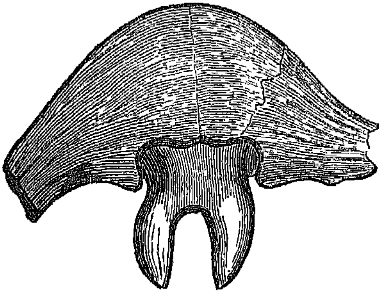


THE APTERYX.

In these creatures we have evidences of that restless activity in nature by which every possible variety of the primitive types is filled up; so that there is no department of nature, no possible deviation from a standard form, but has its representative and life in multitudinous forms without end.

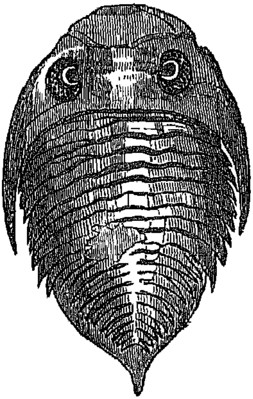
THE TRILOBITE.

GEOLOGICAL wonders are striking, and the imbedding of marine insects are a sort of way-mark, telling us what has lived, and how long since. In that transition called the *grau wacke group*, we have fossil remains of ferns, mosses, and other flora, which have quite disappeared and given place to others; polypi and shell-fish are also here: the former having all the variety of stars and stalks and branch-like arms, like those at present existing. The *Ammonites* and *Nautili*, of various sizes, are also here; but that to which we would direct attention is a mysterious little creature, neither polypi nor molusca, and hardly crustacea; and yet here it is an object of curious study, upon which so much has been written, and much so well written, that we will but simply say, Mr. Milne Edwards arranges it under the head of a tribe called *Branchiopoda*, and presents a head, a thorax, and an abdomen; that the head is clypeiform, ordinarily rounded in front, truncated or concave behind, convex above, and most frequently divided by two depressions or longitudinal furrows into the three lobes, more or less distinct. Tubercles are sometimes found on the upper surface of the head, at which place Mr. Edwards thinks he discovers reticulated eyes. But Dr. Buckland has said so much about the eyes of these creatures, that we feel obliged to revert to his statement. He says their eyes are deserving peculiar attention; preserved in their fossil state, they are the most ancient and almost the only example yet found in the fossil world, of the preservation of parts so delicate as the visual organs of animals *that ceased to live, thousands, perhaps millions, of years ago.* We must regard these organs with feelings of no ordinary kind, when we recollect that we have before us the identical instruments of vision, through which the light of heaven was admitted to the sensorium of some of the first created inhabitants of our planet.



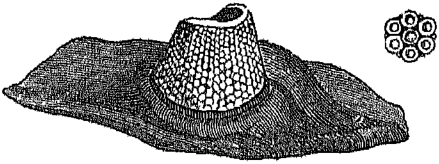
Under surface of the anterior portion of the shield of the thorax.

The *trilobite* has a head and eyes, below which is a body of no great length, covered with shelly plates in the manner of a lobster's tail, and terminating in a narrow rounded point: the rudiments of paddles or feet have disappeared, so also have antennæ or feelers, but these being of such fragile material, they may have perished ere they made an impression upon that mass which was to preserve the other more dense proportions. The most interesting feature in the protracted and enduring preservation of this creature is the eye, which is still preserved, though many thousand if not millions of years have elapsed



THE TRILOBITE.

since it was built up, perhaps, in its living tomb. Several specimens are before us, and we give an illustration showing how strangely conservative is God in nature. The eye of the trilobite is formed of many thousands of facets or lenses, as some of the aërial insects with which we are still surrounded. In one that underwent minute examination we found four hundred spherical lenses in separate compartments, on the surface of a cornea projecting conically upwards, so that the animal in its usual place at the bottom of waters could see everything around. As there are two eyes, one of the sides of each would have been useless as it could not look across to meet the vision of the other, but on the inner side there are no lenses, that nothing may, in accordance with a principle observable throughout nature, be thrown away. It is found in the *Serolis*, a surviving kindred genus, that the eye is constructed on exactly the same principle, except that they are not so high, which seems a proper difference, as the back of the Serolis is lower and presents less obstruction to the creature's vision. Dr. Buckland remarks that, in eyes constructed on this principle the image will be more distinct in proportion as the cones in a given portion of the eye are more numerous and long, and that as compound eyes see only those objects which present themselves in the axis of the individual cones, the limit of their field of vision is greater or smaller as the exterior of the eye is more or less hemispherical. To look downward was as much impossible as it was unnecessary to a creature living on the bottom of the water; but for horizontal vision in every direction the contrivance is complete. The form of each eye is conical, except that the inner side rises higher and presents a sort of shield each to the other, there being no vision needed inwardly. The exterior of each eye, like a circular bastion, ranges nearly three-fourths of the circle, each commanding so much of the horizon that where the distinct vision of one eye ceases that of the other begins, so that the combined range of both eyes was panoramic. The conditions of sea and atmos-


The Eye of the Trilobite.

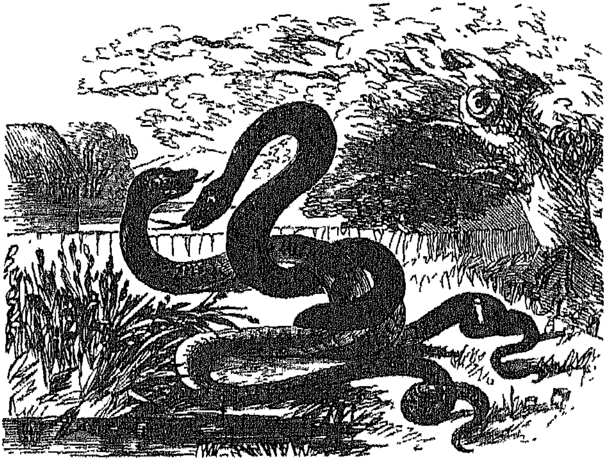
phere can have undergone no change in relation to the light imparted and the means available for its use. These early *instruments of vision are minute optical adaptations to creatures* living at immense depths in the ocean, and prove there can be no alteration either in the method or means of making both available for their well-being.

"This little organ (says another writer) of a trivial little animal, carries to living man the certain knowledge that millions of years before his race had a being, the air he breathes and the light by which he sees, were the same as at this hour, and that the sea must have been in general as pure as it is now. If the water had been constantly turbid or chaotic, a creature destined to live at the bottom of the sea would have had no use for such delicate visual organs." "With regard to the atmosphere," says Dr. Buckland, "we infer that had it differed materially from its actual condition, it might have so far affected the rays of light, that a corresponding difference from the eyes of existing crustaceans would have been found in the organs on which the impressions of such were then received. Regarding light itself also, we learn, from the resemblance of these *most ancient organisations to existing eyes, that the* mutual relations of light to the eye and of eye to the light, were the same at the time when crustaceans endowed with the faculty of vision were placed at the bottom of the primeval seas as at the present moment."

SNAKES.

AWAY among the Alleghany Mountains are a number of farms each distant from the other some miles, and men living here have Nature and observation for their great tutors. Stopping one day at a farm where much hemp had been raised, I happened to say to the farmer, I have just seen a black snake glide through the stubble, and felt horrified at its length. "Well," said he, "do you know I once saw a sight which, while it most wondrously interested me, made me quail for its consequences.

"It was early in the fall of 1816, and I had got an English newspaper, and was pretty considerably engrossed in the accounts of the great Congress at Vienna; and while I puffed at my pipe, and took my long breaths over the paper, I heard a strange hissing and snapping, as if all the stubble in that hemp-field there was being removed at once. I paused, and listened; and crush succeeded crush, and hiss succeeded hiss. I felt a strange quiver come over me, and I ventured very cautiously to the spot from whence the sounds issued, when I found two snakes chasing, and turning, and twisting, and dashing each after the other. I stepped up an old hiccory tree which was so gnarled as to admit of easy access to its branches. I clearly perceived the reptiles were in hot pursuit, and had neither time or inclination to attack me, and here quietly and intensely I watched the contest. The first of these repulsive creatures was a great black snake from the mountains, with all the damask-like appearance that variety in colour could give to it; every undulatory motion was that of pride and daring; the pursued was tortuous and serpentine to an extraordinary extent; in its movements eel-like and slippery—for it was a large water-snake, which had ventured up from a rushy brook running round my field. How they had come in contact I could not ascertain, but their chase continued for full five minutes; the water-snake attempting a retreat towards the water, but the black snake intercepting him. They were each, I should say, about six feet long, and having exhausted themselves in chase, they came up and manfully faced each other. I have heard the crash of ships when their yards have been locked, and now a scene and a bound



THE BATTLE OF THE SNAKES.

not much inferior took place. Their tails beat the ground, and leaves and stubble readily yielded to the force. The eyes of the water-snake were bright, but those of the black snake sparkled like fire itself; and as the keen eyes of the water-snake watched his antagonist, the other with a depressed or contracted head slowly raised himself until he was about three feet erect, and throwing himself across the slippery body of his foe bound him in a moment just under the throat. And almost at the same instant he took a coil with his tail round a hemp stalk close to the ground, and holding on, injected his fangs and bit his enemy with such vehemence that it seemed terrible. Nor was the water-snake less formidable, for in an almost incredible space of time he had gripped his fellow in a similar manner, and folding him so as to appear to give the most exquisite pain. The black snake, without losing his hold by the tail, elongated that part of his body near his head, but contracted the extremity between that and his tail, so as to give the muscles the appearance of knots. A momentary liberation took place; when half creeping and half erect the black snake made another attack, each as before seizing with their tails the nearest hempen stubble; they pulled until both stalks broke, and rolling each over the other they looked like balls or irregular stones; but notwithstanding the courage of the water-snake, as though away from an element in which he was more at home, he always sought to retreat there, which being as readily perceived by the black he as promptly interfered and turned him aside; there was no want of determinate daring; each ran at the other with open jaws, and each coiled rapidly round the other's body; at last, as though by mutual consent, each being fast to a stubble root, gripped the other more fiercely than before, tugging with all their might and lacerating each other with their jaws, the eyes of both seemed lurid with rage and ready to start out of their heads. The knots of muscles by which their strength seemed to be developed, grew and relaxed with such wondrous rapidity that I lost all thoughts of myself. Their throats became inflated, and their heads, like the body, constantly wore new aspects. Their hissing was only suspended during their bites, and such an appalling hiss was it, that at first it made me as uneasy as a screeching file upon the teeth of a saw. The black one struggled afresh, renewed his muscular effort, and snap went the stubble, and over and over once more went those direful living engines of evil. The elongation of the water-snake proved he was hastening away; the other pursued. And never shall I forget the rapidity of motion—everything yielded before them—and in a moment dash they both went into the water. I hastily followed them, and their renewed combat was now short; the water-snake was at home, and up and down for some few minutes they came: the water did not extinguish their rage, for they appeared and re-appeared, sometimes amongst the rushes and sometimes in the open stream. The water-snake bent itself in two great folds, and gripping his opponent he tried to drag him beneath the water. The black snake at this moment made himself fast to the stump of a tree of small dimensions, or a fixed piece of wood of some sort, and with equal force gathered himself again into knots; the struggles of the water-snake were those for life, and diving, he drew his mortal foe down with him; but soon they were again upon the top, and the perceptible wounds of the water-snake under his throat, the vindictive rage of the other, and the sudden disappearance of both together, held me yet in watchful suspense. At length they both rose twisted or bound together, as in the first part of their combat; the head of the water-snake was below, and an evident relaxation of muscle showed that the black snake had beaten his antagonist in his own element, for loosing him he was carried along with the tide, when the black snake again made the shore, and disappeared.

HOW THEY CATCH SNAKES.

MUSIC hath charms, is often repeated, and yet people denounce music, and feel unwilling to make it common for all the people. The travelling Faquirs, a sort of priest or religious devotee, who pretend to almost anything, even to that of being buried alive, have great reputation among all people living around them. Wild beasts, they say, never touch them, stinging insects never harm them, and venomous reptiles never bite them. They wander about like gypsies, or take up a station or position and continue a figure they never quit. On one occasion one of them called at my house as an amateur musician, singing in low pensive monotonous strain to a sort of banjo he carried swung before him, he also had a basket and a pipe, and after the first exhibition of his musical abilities, he opened his basket, which he had placed on the ground, and laying aside his banjo, he put his pipe to his lips, and gave forth a series of smart wild sounds, and accompanied them by a sort of bass made by his own voice while blowing, and out of the basket crawled slowly a very beautiful snake, which in an erect posture performed a series of gyrations, and then resting itself, again went through all the undulations and vermicular contortions it was capable of. Again and again it would erect itself, and follow the sounds of the pipe as the man with eyes intent drew it from side to side of the building. My servant, an old Scotchman, who thought his deep sonorous hum accompaniment to his pipe not unlike his own mountain music of the bagpipe, asked him a great many questions, and amongst others would he make a strange snake dance? and how would he act could he attract one from its hole? adding, we are quite infested here with them. The man assured him he possessed the power, and for a small gratuity he would at once give occular demonstration. The promise of reward being made the man began to pipe before a hole where a snake had been seen to enter. In a very short time, cautiously, a snake of considerable size put his head out of the hole, and moving towards it the man stooped until the reptile seemed perfectly enchanted with the sound: at first it raised its head, then it came further out of the hole, and at last, like the one he carried in the basket, it raised itself on its tail, and was preparing to follow the man, when by a most dextrous movement he gripped the venomous creature by the throat, and held him fast until he opened his basket and put it alongside the one already coiled up there. My servant in an ecstacy came to tell me of the Snake-catcher, and having made his salaam as I entered, he asked, If there were any more? Yes, said my servant, they kill the poultry, and one large one bit an ox which died There was a Cobra entered that hole, and no one has seen him leave it; perhaps he has another way out. No, no, said the Faquir, only one way in and the same way out. And placing his pipe again to his lips, he began piping more shrilly, omitting the hum, and as I suspected a trick, I was astonished to observe that he put his pipe up, and began by calling the snake within, by all sorts of ugly names, threatening what he would do if he did not come out. He again began piping, and making a sort of dancing gesture before the hole, sometimes stooping and then raising himself erect, but piping all the time shrilly. Not more than five minutes had elapsed when a hissing noise, and a rustling as of something crawling through straw was heard. Mute with amazement and breathless with fear, my servant and I stood ready to escape, for we were prepared to believe this was the snake which had killed our bullock and our poultry. We looked intently as the noise awoke up our senses, and forth from the hole protruded the head of as large a *cobra capella*, the most venomous kind of serpent which I have ever seen in India. Its arrow-like tongue, distended jaws, and flashing fire-like eye seemed to me to threaten mischief. The Faquir waved his hand, and looked hard at us to be quiet; we stood motionless, and further and further the creature protruded himself, until at last he raised his head. Now the Faquir approached him, keeping each move the reptile made, and his face towards that of the snake; louder and more shrill did he pipe until all its length was clearly seen. He now piped with one hand and motioning us to be quiet, when the snake darted at his body, but by a dextrous snatch he caught him by the tail. Holding it fast he called to my servant to despatch him, which he did by one stroke of a stick. I had often heard it said that there were those who could catch snakes and draw them from their holes. I have seen it, and write the account that, if you please, you may publish it. In the space of an hour the Faquir drew five venomous snakes from their holes and killed them all. T. I. W.

SERPENT FASCINATION.

M. VAILLANT, in his Travels into the Interior of Africa, says, that the fascinating power of serpents is so extraordinary, and yet is believed by everybody, that there can be no question of its truth. All travellers give the same testimony, and as we have some extraordinary cases upon record, we beg to lay their accounts before our readers.

A gentleman away in the south, says, "I was riding quietly and thoughtfully up a creek, when my attention was arrested by a ground squirrel, which danced and capered with so much strange and awkward grace, that I literally alighted from my horse, and advanced a step or two, that I might see the cause; not at all diverted, the little creature gradually restricted his gyrations, and reduced the run from side to side, and at last laid down, rolled, quivered and squeaked, but at this moment I saw protruded from an orifice in the tree before which he danced, the head of a rattle-snake, which immediately opened his jaws, and was in the act of taking the devoted creature into them, when, with the stick which served instead of my riding whip, I gave the snake a smart blow over the head. He retired, whether killed or not I don't know, but the squirrel liberated, bounded off, and I pursued my journey.

"When I was a boy, about thirteen years of age, I lived with William Atkinson, an honest man in Bucks County, who returning from a ride in warm weather, told us that while his horse was drinking at a run, he heard the cry of a blackbird, which he espied upon the top of a sappling, fluttering and straining the way it seemed unwilling to fly, and holding so fast by the sprigs it was perched upon, that the sapling top bent.

"After he had viewed the bird a few minutes it quitted the place and made a circle or two higher in the air, and then resumed its former standing, fluttering and crying. Thereupon William, who was with me, rode the way the bird strained, and soon spied a large black snake in coil, steadily eyeing the bird. He gave the snake a lash with his whip, and this taking off the snake's eye from his prey, the charm was broken and the bird flew away, changing his note to a song of joy.

"When I was engaged as a surveyor I had frequent opportunities of seeing snakes, and as I stood one day very sluggishly leaning over a fence I saw a large rattle-snake in as pretty a coil as a painter could have desired. The only apparent living part of it was its head, which moved to and fro. My eyes fell upon it, and immediatly I lost power to move. I felt surprised — dizzy — and indifferent. How long I was so I do not know, but my pressure against the fence caused a piece of timber to fall; the movement aroused me, and made my fascinating enemy glide off. And so I was saved, but the feeling of horror, sickness, and fainting that came over me, affects me even while I tell it."

Another traveller says, "I was passing through Maryland with three others, when one was observed to stop behind without any assignable cause; his companions called him, but he not moving one returned and upbraided him with indifference of their companionship; but not moving, he came close up to him, and, taking him by the arm, pulled him towards him, saying, 'Why do you linger, man?' He now observed his eyes were fixed, and directing his to the object of vision, saw an immense rattle-snake half bowing and half crawling towards him. His companion heard him ejaculate, 'He will bite me! he will bite me!' and replying with the jerk or pull he gave him, he said, 'Yes, he will bite you sure enough, if you don't come away.' The enchantment was now at an end, and turning to his friend he fell prostrate into his arms, was very faint and sick, and was long ere he recovered."

In addition to the above instances, I shall relate the following, which was told me by Mr. Thompson, a gentleman who resided fourteen years at Burlington, near Philadelphia. He says that, one day, he was fishing in a brook near Burlington, when he suddenly turned his head and saw a very large black snake eyeing him with a steadiness of gaze that made him quail. From that moment he became motionless, and rigidity stole over his muscles; he was filled with horror, and unable to avoid the snake, which he saw approaching towards him. But just at this juncture his faithful dog, aroused by the uncoiling of the snake, barked, and advanced to attack the reptile. Immediately the snake, diverted from the man, pursued the dog. The man, awaking as from a painful trance, breathed thickly, and anxiously looking around longed to be at home. The dog having driven off the enemy now guided his master to where the attention and kindness of friends soon restored him.

IMITATIVE INSECTS.

We attach the above heading to this article because we cannot better express the object we have in view, not because such a title fully or fairly expresses it. We do not intend to treat of insects which have the faculty of imitation, for the simple reason that there are none such. Insects are so truly the creatures of blind instinct, that there is no mental power to fit them for imitative acts, and indeed they may be considered as incapable of any kind of teaching, their lives being ruled by impulse rather than by reason. There are, however, several curious insect forms which bear strong resemblances to other objects, and which, from this resemblance, have attracted much attention from mankind as beings truly wonderful, and attractive to the attention of the philosopher, the fancy of the credulous, and the fear of the superstitious.

The first of these we shall mention is the

LANTERN-FLY,

which is a native of South America, and common in Surinam. The traveller who first observes this curious insect would hardly venture to describe its peculiarities on his own single authority, its appearance being so unlike anything before known. To have said that it throws out a light, bright enough to read the smallest print by, and that, when several are tied to a stick, they afford as much light as a torch, would hardly have met with belief; yet both these statements are undoubtedly true. The insect is in fact a capital imitation of a lantern, but a living lantern, requiring no oil but its own life-blood, and literally illuminating by the agency of the *vital spark*. The chief curiosity of the insect is its head, which is prolonged to such an extent as to equal the rest of its body in size. This is the seat of the illuminative power, and it has the appearance of a transparent bladder beautifully marked with red and green.

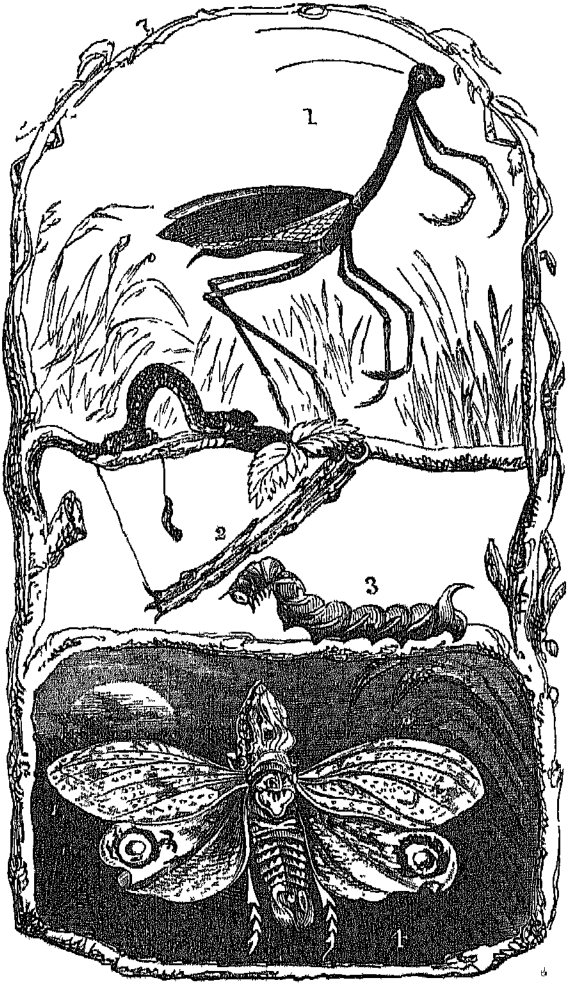
Madame Merian, the celebrated writer on insects, gives an interesting description of the effects produced by their appearance at night. "Some one having one day brought a number of lantern flies, I put them into a great box, being at that time ignorant of their luminous properties. During the night, hearing a noise, I jumped out of bed, and a candle being brought to me, I soon found that the sound came from the box, which I quickly opened. But, frightened at seeing a flame, or I should rather say, as many flames as there were insects, proceed from it, I at first dropped it. Having recovered, however, from my astonishment, or rather fright, I recaptured all my insects, in admiration of their splendid appearance." The only insect in Britain possessing this luminous power is the glow-worm, whose pale blue flame is very feeble compared with either the lantern-fly or fire-fly of the tropics.

THE LEAF INSECT

Is a frequent object of interest in the tropics. It belongs to the locust family, and the wing-cases, not only in colour but in texture, and even in veining, are so exactly like leaves, from the fresh green of those newly expanded to the faded brown of those withered and fallen, that botanists themselves might be deceived, if they were detached from the insect and exhibited as real leaves. Among the locusts of Fabricius alone, we find the various species with wing-cases resembling in this manner the leaves of the laurel, the myrtle, the citron, the lily, the sage, the olive, the camellia, thyme, and grass.

The Spectres, on the other hand, resemble small branches of trees with their spray; and so minutely that the very snags and knobs, as Kirby and Spence remark, are accurately imitated. Those who are curious in such matters may readily find similar instances in some of our native caterpillars, by no means uncommon. In the latter part of summer, for example, by beating the bushes of a hawthorn hedge while an umbrella is held under, the caterpillar of the Brimstone Moth may often be found, appearing, as it stalks along the whalebones of the umbrella, like a self-moving withered branch, the skin being wrinkled and furrowed like the bark, while the bulgings of the rings and a notched protuberance on the back add much to the resemblance.

The caterpillar of the Swallow-tailed Moth most strangely imitates the tree on which it feeds; for its ringed bulgings



The Giraffe Cricket. 2. Caterpillar of the Swallow-tailed Moth, 3. The Sphynx Caterpillar. 4. The Lantern-Fly.

are exactly like those of an alder branch, a tree to which it is much attached; while the longitudinal stripes are like the cracks in the bark. When not feeding, these caterpillars rest upon their pro-legs, with their body stretching out at various angles from the branch,their only support being a thread of silk, from which the head hangs, in order that they may always be ready to drop down in safety, by extending this thread, on the sudden approach of danger. As they feed chiefly at night, they may be seen continuing in this stiff and singular attitude for a whole day without moving. "So that doubtless," says Kirby, "the sparrows and other birds are frequently deceived by this manœuvre, and thus baulked of their prey. Rösel's gardener, mistaking one of these caterpillars for a dead twig, started back in great alarm, when, upon attempting to break it he found it was a living animal.

Quite as interesting in its history is

THE SPHYNX

Caterpillar, which is a grub of the Privet Hawk-Moth, and may be found in plenty in the hedge-rows of Great Britain. In its usual position, with the head uplifted in a very grave and rigid manner, it strongly reminds the observer of the far-famed Sphynx, whose riddles puzzled all the world till Œdipus began to solve them. This caterpillar is so tough that it can survive almost any amount of ill-usage. Bonnet squeezed one under water till it was as flat and empty as the finger of a glove, yet within an hour it became plump and lively, as if nothing had happened.

THE CAMEL CRICKET

Merits a notice here on account of its strange resemblance to a camel; and another of the same family, from a similar resemblance to another animal, is called

THE GIRAFFE CRICKET.

These singular animals are known only in the warmer parts of the world, where they have become celebrated for their peculiar manners and quarrelsome disposition. When at rest, they are generally seen in a sitting posture, with the two fore-legs close together, and thus appear as if they were praying; similarly to the Mantis. They frequently make vast havoc in the crops, and throughout the whole of India and the north of Africa they are dreaded as destructive visitants. The Giraffe Cricket was caught two miles from Quitta, on May 29. 1846.

It has six wings, the outer ones something like the wings of a beetle; those beneath of a very delicate green colour; and the undermost ones of fine network. The height of the cricket is five inches; it has very long legs, the foremost of which it employs as a means of defence.

We may suitably conclude this paper by a short notice of the

SOUTH AMERICAN SPIDER,

Which though not sufficiently peculiar in its appearance to imitate any special object, is, nevertheless, worthy of the interest it has already attracted on account of its immense size and extraordinary habits. It is called *Aranea avicularia*, from its actually being strong enough to destroy small birds, by first wounding them with its poisoned fangs and then sucking their blood. The whole of the animal's body is covered with brown hair, and the fangs are so large that the slit near the end through which the venom is ejected, may be seen without a glass. The legs of this spider are as thick as a moderate sized goose quill, and are each terminated by two strong claws. We may judge how formidable such an insect must be when we consider that the body, including the head, is nearly three inches long, and that, when the legs are stretched out, the whole will measure eight or nine inches. Eight eyes are placed in the front of this creature's thorax, two of which are much larger than the rest. Thus formed for a life of rapacity, the bird-catching spider watches for its prey among the branches of the trees, and certain destruction awaits the little animal that is unfortunate enough to be entangled in its snare. There are few of the products of the animal kingdom so remarkable in history and character as this rapacious and giant spider.

THE WONDERFUL FROST OF 1814.

Few events in the domestic history of this country stand out more prominently than the Great Frost of 1814. Happily, great frosts are by no means common in this climate, and when such an event happens, it excites much attention, and is long remembered. The greatest cold ever observed in London was in 1796, but remarkably severe winters occurred in the years 1716, 1788, 1808, and 1814; not to mention others of much earlier date. That of 1716 was celebrated, like the one we are about to describe, by a great fair held on the river Thames.

In the winter of 1813-14, the frost set in about the middle of January. The increase of cold was gradual, and though extremely severe, it was little felt, on account of its slow increase, and the dryness of the air. The houses and trees were soon incrusted with sparkling spiracles, and the glass was covered with thick white frost. Everywhere was seen the glittering icicles and knobs of crystal, and when the sun shone, the earth seemed powdered with sparks of fire.

> Look! the massy trunks
> Are cased in the pure crystal; branch and twig
> Shine in the lucid covering; each light rod,
> Nodding and twinkling in the stirring breeze,
> Is studded with its trembling water-drops,
> Still streaming as they move, with coloured light.

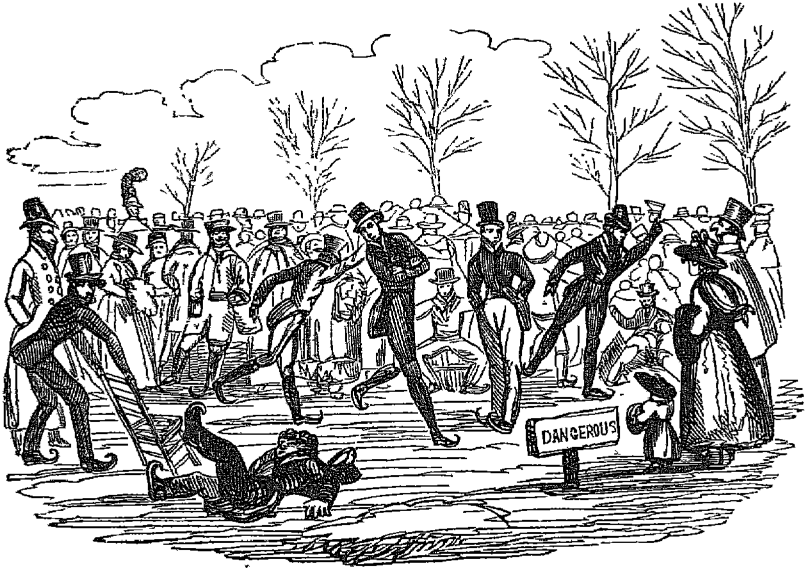
The effects of the frost were soon seen in a manner less poetical. Butchers were compelled to keep their meat in cloths near the fire; gardeners were prevented from following their vocation, and went in parties begging through the streets; and coaches were stopped in their passage, to the peril of both cattle and men. The Cambridge mail-coach, coming to London, sunk into a hollow of the road, and remained, with the snow drifting over it, from one o'clock to nine in the morning, when it was dragged out by fourteen waggon horses. The passengers, who were in the coach the whole of the time, were nearly frozen to death.

On the 26th of January a slight thaw took place, and the ice which had formed on the Thames was broken up, and huge masses were hurried down the stream with much violence, and sounds like those of artillery. The thaw continued till Sunday the 30th, when a sharp frost again set in, and continued till the following Saturday, the 5th of February. All over the country the frost was equally rigorous. The Mersey and Tyne were frozen over, and numerous accidents to coaches occurred on the roads. For the first time in the memory of man, the skater made his appearance under Bristol bridge. At Whitehaven, the supply of water was entirely stopped, and the market was suspended in consequence of the necessary cessation of travelling. At Dublin, the snow was thicker than had ever been before known there, and at Canterbury the military were called out to open the roadway through the snow. At Dalrymple, much damage was done by the sudden flooding of the Doon, which inundated houses, farms, and gardens, and flowed not merely into, but over the roofs of many of the houses.

Other casualties of even greater account occurred. A woman was found frozen to death in the Highgate road. A poor woman named Wood, while crossing Blackheath from Lea to the village of Charlton, accompanied by her two children, was benighted, and missed her way. After various efforts to extricate herself, she fell into a hole, and was nearly buried in the snow. From this, however, she contrived to escape, and again proceeded; but at length, being completely exhausted, and her children benumbed with cold, she sat down on the trunk of a tree, where, wrapping her children in her cloak, she endeavoured by loud cries to attract the attention of some passengers. Her shrieks at length were heard by a waggoner, who humanely waded through the snow to her assistance, and taking her children, who seemed in a torpid state, in his arms, he conducted her to a public-house; one of the infants was frozen to death, and the other was recovered with extreme difficulty.

At Kipton, the body of a child was found buried in the snow to the depth of twelve feet, and immediately afterwards the body of the mother was found in the same situation. A Mr. Apthorne, a grazier, who left Hounslow on Monday evening to proceed to Upham, was frozen to death, and his body found in the road; and the same unhappy fate befel Mr. Husband, of Holroyd Hall, when within a hundred yards of his residence. Two other persons lost their lives in a similar manner. During the whole of the six days the thermometer continued at seventy degrees Fahrenheit, which is twenty-five degrees below the freezing point: a similar continuance in this country of the same temperature for the same space of time is not upon record.

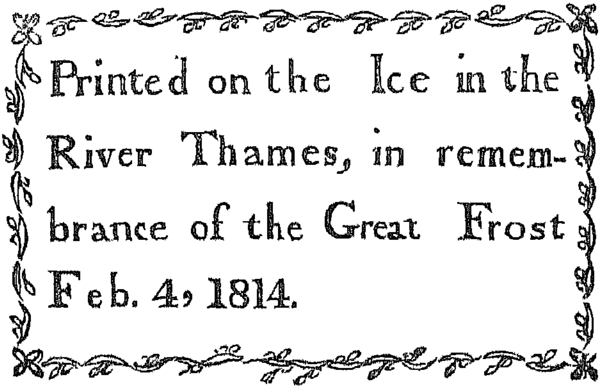
On Sunday the 30th of January, the Thames was still full of blocks of ice, which were drifting against the bridges, and completely blockading the river. The return of the frost united these together, and on the next day several persons ventured to walk across the river. At one time, seventy persons walked from Queenhithe to the opposite shore; and, on the next day, the ice was so firmly knit, that the tide had no effect whatever in moving it. Soon the river became a scene of festivity, and thousands flocked to see the novel scene which presented itself. The orgies commenced with the roasting, or rather the toasting of a sheep, over a coal fire placed in a large pan. Of course a vested interest was created, and sixpence each person willingly paid for a peep at the ceremony. The carcase, when singed and smoked by the process, was sold at a shilling a plate, under the name of "Lapland mutton." While this was going on, booths sprung



THE THAMES IN 1814. [*Fac simile.*]

up on the ice, flags were set flying, drums beat and trumpets blown; and the ordinary English luxuries,—gingerbread, fried sausages, dirty tripe, rank tobacco, frozen trotters, gin, beer, and ginger-pop, were distributed plentifully amongst the hungry but not dainty mob.

On Wednesday, FROST FAIR was in full favour, and a grand walk was established between Blackfriars' and London Bridges, called the "City Road." Several printing presses were erected, and papers commemorative of the "Great Frost" were printed and sold in abundance. The annexed engraving is a fac-simile of one of them.



Printed on the Ice in the River Thames, in remembrance of the Great Frost Feb. 4, 1814.

At one of the presses, an orange-coloured standard was hoisted, with the watch-word "Orange Boven," in large characters. This was an allusion to the recent restoration of the stadtholder to the government of Holland, which had been for several years under the dominion of the French. From this press the following papers were issued.

"FROST FAIR.
"Amidst the arts which on the THAMES appear,
To tell the wonders of this *icy* year,
PRINTING claims prior place, which at one view
Erects a monument of THAT and YOU."

Another:

"You that walk here, and do design to tell
Your children's children what this year befell,
Come, buy this print, and it will then be seen
That such a year as this has seldom been."

Another of these *stainers of paper* addressed the spectators in the following terms: "Friends, now is your time to support the freedom of the press. Can the press have greater liberty? Here you find it working in the middle of the Thames; and if you encourage us by buying our impressions, we will keep it going in the true spirit of liberty during the frost." One of the articles printed and sold contained the following lines:—

"Behold, the river Thames is frozen o'er,
Which lately ships of mighty burden bore;
Now different arts and pastimes here you see,
But Printing claims the superiority."

The Lord's Prayer and several other pieces were issued from these icy printing offices, and bought with the greatest avidity.

On Thursday the fair was still more crowded, the ice seemed as firm as a solid rock, and every feature of an ordinary fair was to be seen upon the Thames. The next day it continued the same; but on Saturday the symptoms were unfavourable, and FROST FAIR seemed on the verge of dissolution. On Friday many remained on the ice till late at night, in order to enjoy the singular beauty of the moonlight; but even then a thaw was threatening. Still thousands flew to the scene of attraction, which was crowded with people and with novelties of every description. Gambling tables, ambling donkies, tea and coffee saloons, skittles, and dancing booths, were among the attractions, while the boatmen of the bridges were making large sums by the exaction of fees for entrance to the fair. In the evening a shower of rain fell: crack went a large slice of the ice, and away went the portion which had separated from the main body, carrying with it printing presses, booths, and merrymakers, to the no small dismay of publicans, typographers, and sojourners. The dissolution was certain, and became the topic of conversation and jesting while the ice yet lasted. From one of the presses issued the following *jeu d'esprit,* written impromptu by a bystander.

To Madam Tabitha Thaw.

"Dear dissolving Dame,

"FATHER FROST and SISTER SNOW have *Boneyed* my borders, formed an *idol of ice* upon my bosom, and all the LADS OF LONDON come to make merry: now as you love mischief, treat the multitude with a few CRACKS by a sudden visit, and obtain the prayers of the poor upon both banks. *Given at my own press,* the 5th February, 1814.

THOMAS THAMES.

The thaw was more rapid than the preparations of the company to depart. Two young men were floated on a piece of ice above Westminster Bridge, and both were drowned before assistance could reach them. A publican had erected a booth opposite Brook's Wharf, and leaving it to the care of nine men, went ashore at night. At two o'clock the next morning it was drifted away. In their fear and confusion the men set fire to the booth, which floated on the waters a mass of flame. They then succeeded in getting into a barge, but in this were soon wrecked, and two of their number perished. Throughout Sunday the Thames was a miniature frozen ocean; covered with masses of drift ice, and thronged on each side by disappointed maids and 'prentices' who betokened in their looks their regrets for the destruction of "Frost Fair." On Monday a vast amount of damage was done to the vessels lying in the river by the immense fragments of ice which floated with the tide; but the frost was now at an end, and old Father Thames soon resumed his business aspect, as the blood in his veins recovered its fluidity.

The view of the Thames is a fac-simile of an engraving designed by G. Cruikshank, for "Hone's Every Day Book."

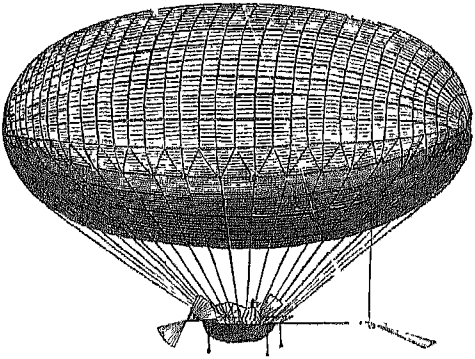
WONDERS OF AEROSTATION, OR BALLOONING.

MODERN aërostation is a thing of such frequent occurrence, during the summer months, in the Metropolis, that in mentioning a few of its wonders, or of *air navigation*, which is what aërostation signifies, it will not be necessary that we should say much respecting those ascents with which the denizens and visitors of Vauxhall and Cremorne are so familiar. But at a time, such as the present, when ballooning has become a daily amusement, associated with the tricks of mountebanks, and the feats of men who act as if their lives were of no value,—and perhaps it is so—it will be a source of interest to the readers of "Wonderful Things," if we briefly trace the history of this wonderful discovery.

The word balloon is of French derivation, from *ballon* signifying a ball; and this ball or balloon floating in or navigating the air is called aërostation. The theory of aërostation has long been familiar to the students of natural philosophy, but its successful application is comparatively of recent date. Before stating the theory, it may be as well to mention what will render the theory itself more lucid, when stated, that the air or atmosphere, though invisible, possesses the properties of *bulk*, *weight*, and *elasticity*, and that it is heaviest near the earth's surface, being then compressed by the superincumbent weight of the atmosphere above. The theory, therefore, is simply this—any body or substance of a certain bulk, being lighter than the same bulk of atmospheric air, will rise until it come to that point when bulk for bulk they are equal in weight, or, in other words, of the same *specific gravity*. Balloons, therefore, rise and float, because they, with the weights attached to them, whether of men, or any kind of machinery, are lighter than the same bulk of the atmosphere. There are, however, no *solid bodies* which are sufficiently light for this purpose, and therefore recourse is always had to some fluid—air is called a fluid, or aëriform substance. Those substances most commonly used are hydrogen, and carburetted hydrogen, or common coal gas. The first, when pure, is about fifteen times lighter than atmospheric air, the second about one-half its weight Thus a globe-like apparatus, of lutestring, filled with and rendered impervious to the included hydrogen, is what we call a balloon, and will rise in the air till it reach the place where the atmosphere is equal to its own weight. If a cork be placed at the bottom of a river, it immediately, on being liberated, rises to the top, for precisely the same reason as that which causes the balloon to ascend in the air, because it is lighter than water. Balloons always carry ballast, chiefly sand-bags, which are emptied when the aëronaut wishes to ascend rapidly, which is sometimes the case when there is danger of coming in contact with trees, church steeples, or the tops of houses.

The first used were fire-balloons, called also the Montgolfier's, after their inventor. These rise in the atmosphere, because the air in them is rarefied, or rendered lighter by heat, often by burning spirits of wine, with which a sponge is saturated. "One degree of heat, Fahrenheit's, will expand the air one five-hundredth part; and, therefore, it will require about five hundred degrees, or more nearly four hundred and eighty-four, to expand or rarefy the air to double its bulk." This degree of rarefication by heat is, however, impracticable for aërostatic purposes, and therefore a gas specifically lighter than air is always used.

Various schemes, at various times, and with various degrees of success, have been attempted for navigating the air; some upon the principles of mechanism; among which we may mention the Patent Aërial Machine, of which the following is an illustration, and of such must also have been the *flying* *pigeon* made by Archytas, the *flying eagle* and the *fly* by Regiomontanus. Others have attempted this feat by attaching wings to the human body, moved by the help



of mechanical powers, either by the hands or feet, by which means they hoped to transport themselves through the air after the manner of a bird. But this plan has never succeeded; perhaps it never will; and yet it is not thirty years since "the inhabitants of a town, not sixty miles from London, went to see a man fly, which ended in his sliding down a rope from the top of a building."

Roger Bacon, who lived in the twelfth century, states, that he knew "how to make an engine, in which a man sitting might be able to carry himself through the air like a bird;" and he further affirms "that there was another person who had tried it with success." His secret consisted in having a couple of large thin shells, or hollow globes, of *copper, exhausted of air*, and being thus rendered lighter than their own bulk of atmosphere, he affirmed they would ascend. Bishop Wilkins, who died in 1672, mentions a similar plan as being entertained by different persons. It would seem, also, that he had some idea of a heated air-balloon. F. Francisco Lana, in his work, entitled "Prodroma," printed in 1670, proposes, as his own idea, the same method as that of Roger Bacon, and goes into particulars, showing how much a globe of plate brass of a certain size would weigh; how much less than the atmosphere; and how much additional weight it would consequently carry up with it. But we have the strongest possible proof that the scheme was never tried, in the fact, that it overlooked two conditions which are fatal to it, viz., that balloons must be *filled*, or the external pressure of the atmosphere would instantly crush them, and filled with something which, though lighter, is as elastic as the air, that is to say, though *of less weight* will only *occupy the same space*. Hence, despite the affirmations of those grave and learned ancients, who, as the Irishman said, are always borrowing our ideas, we are forced to the conclusion that the practical means of air-voyaging is a modern invention, the whole history of which is comprehended within the last century.

The honour of having first discovered, with any degree of accuracy, the specific gravity of heated air belongs to Mr. Cavendish, who published his experience on hydrogen gas in 1766. Dr. Black, of Edinburgh, shortly afterwards mentioned, in his chemical lectures, that if the allantois of a calf, which is a thin membranous bladder or bag found inside most of the mammalia, were filled with this gas, that it would ascend in the air; but nothing further than the bare mention of it seems to have resulted. About the year 1782, Mr. Cavello first actually attempted the experiment, but even he got no farther than raising some bubbles of two or three inches in diameter, which children had perhaps done from time immemorial. He read an account of his experiments at a meeting of the Royal Society on the 20th of June, from which it appears he had tried bladders and papers of various kinds, and had also attempted to inflate with hydrogen a thick solution of gum, thick varnish, and oil paint, but without success. He could get no farther than soap bubbles. Stephen and Joseph Montgolfier, of Annonay, about thirty-six miles from Lyons, were the next experimenters and aspirants for aërial honours. They were prompted, it seems, not from any consideration of the levity of hydrogen gas, but from observing that smoke and clouds ascend in the atmosphere; and it occurred to them that if they could include smoke in a bag of fine silk it would ascend. Stephen, about the middle of November, 1782, made the experiment at Avignon, and soon after at Annonay, when the bag rose to the height of seventy feet. They had now entered upon the right course, though it is quite clear they did not yet understand the principle on which the effect depended: they supposed that the bag or balloon rose because it was filled with a *gas* which the wood or other material gave out during the burning process, and which was therefore called Montgolfier's gas; they had not yet discovered that it was the heat which rarefied the air in the bag, and that therefore it rose so long as that was continued and no longer.

But the news soon spread to Paris of the success of Montgolfier's experiments, and the philosophers of that city, conceiving that a new gas had been discovered, of about half the weight of common air, and knowing that hydrogen was much lighter, they concluded that it would answer better, and accordingly resolved to make a trial. A subscription was raised to defray *the expense, and M.M. Roberts were appointed to construct the* machine, and M. Charles, professor of experimental philosophy, to superintend the work. After many difficulties, they obtained a sufficient quantity of gas, with which they filled, though they took two or three days to do it, an air-tight silk balloon of the diameter of about thirteen feet, with an aperture like a bladder, to which a stop-cock was adapted, the weight altogether being twenty-five pounds. *On the 27th of August, 1783,* it was carried to the Champ de Mars, and when everything was ready, disengaging it from the cords by which it was held down, it rose in less than two minutes to the height of three thousand one hundred and twenty-two feet, the weight of the balloon being thirty-five pounds less than an equal bulk of common air. After performing a voyage of about fifteen miles in three-quarters of an hour, it fell near the village of Gonesse, occasioning the greatest possible wonder to the peasants who found it. *In consequence of the success of this balloon* experiment, numerous balloons were now made, mostly of gold beater's skin, and in a few days were seen flying about Paris from every direction. But M. Joseph Montgolfier was not to be deprived of his hard won honours, and he therefore constructed a machine, which he exhibited before the Commissioners of the Academy of Sciences on the 11th and 12th of September. *And on the 19th of the same month, before* Louis XVI, the Queen, and Court, and the inhabitants of Versailles, as well as large numbers from Paris, he made another experiment with a balloon the height of which was sixty feet, and the diameter forty-three. Unlike the one already mentioned, which took three days, this was filled in eleven minutes, and triumphantly rose into the air, bearing with it a wicker cage containing a cock, a duck, and a sheep, the first animals that ever ascended by this means to make companionship of the clouds. Two rents caused by the wind soon made the balloon to descend, the animals being as safe as when they went up, and the sheep, it was said, feeding. And now came the ascent of the human animal, which since then has been so often repeated in every country of Europe, with every conceivable variety of attraction, sometimes with the greatest success, and at others with the most disastrous results.

M. Pilater de Rozier, the superintendent of the Royal Museum, on the 15th Oct., marshalled his philosophic courage, and, with an intrepidity which was at least remarkable, if it was not admirable, ascended about eighty-four feet from the earth, the balloon being fastened by cords and not allowed to escape. This was also constructed by M. Montgolfier, in a garden of the Faubourg St. Antoine, and to the aperture in the lower part was annexed a wicker gallery, about three feet broad, with a balustrade about three feet high. From the middle of the aperture an iron grate was suspended by chains, descending from the sides of the machine, and towards the aperture port-holes were opened in the gallery, through which any person sufficiently bold might ascend and feed the fire in the grate, and thus regulate the dilatation of the air inclosed in the machine. The weight of the whole was upwards of sixteen hundred pounds. These experiments were several times repeated, M. Rozier proving to the multitude of observers that the machine might be made to ascend or descend, at the pleasure of the aëronaut, by merely increasing or decreasing the fire in the grate. M. Gironde de Villete now also became a candidate for cloud-land fame, and, placing himself in the gallery opposite M. Rozier, the machine was allowed to ascend, and, to the delight of the wonder-loving inhabitants of Paris, rose to the height of three hundred and thirty feet, where it remained about nine minutes, when it descended gradually to the ground, and the daring adventurers assured their friends that they had not received the least injury by their excursion, which, in the present stage of this amusement, would certainly not be regarded as anything very marvellous.

In consequence of these experiments, M.M. Montgolfier received the annual prize from the Academy of Science, of six hundred livres, equal to twenty-four pounds.

But the crowning feat had still to be performed: the ropes hitherto had confined the aërial monster within given limits, and bound it down to a certain kind of behaviour. This, however, and especially by the volatile French, was not to be endured, the ropes were to be dispensed with, and the balloon was to have its free range; and, accordingly, on the 21st of November, 1783, M. Rozier and the Marquis d'Arlandes took their seats in opposite sides of the gallery, and at two o'clock it was abandoned to the elements, and majestically sped its way upwards to the height of three thousand feet, and after travelling a distance of five miles in about twenty minutes, they ceased supplying the fire with fuel, and it descended gently and safely in a field beyond the new Boulevard Poor

M.M. Rozier and Romain afterwards lost their lives while attempting to cross the Channel from France to England, the balloon taking fire at a height of three thousand feet, from which they fell, and were killed on the spot.

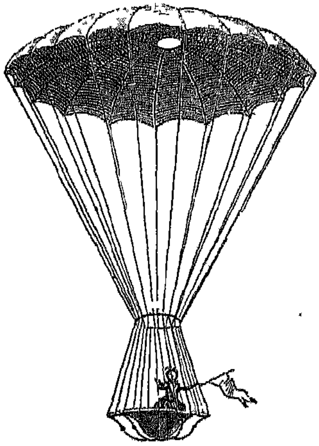
The *first aerostatic experiment made in England was by* Count Tembeccari, an Italian. The balloon was launched from the Artillery-ground, at one o'clock on the 25th November, 1783, and travelled forty-eight miles in about two hours. The first aerial voyage performed in England was by Vincent Lunardi, also an Italian, and the scene of the exhibition was also the Artillery-ground. This balloon was very similar to those now in use, and was filled with hydrogen gas, made by the decomposition of water, by means of zinc and diluted sulphuric acid. He took up with him a dog, a cat, and a pigeon, and the cold was so intense that the drops of water which had collected round the balloon were frozen, and the cat by means of the extreme cold almost lost its life.

A very remarkable ascent was made in France by the Duke of Chartres, the father of the late Louis Philippe, and three other gentlemen, on the 15th July, 1784, which was attended with many alarming incidents, but not with any fatal results to the voyagers. The balloon was of peculiar construction, the boat or car being furnished with a helm and oars, intended to assist in guiding it. Three minutes after its ascent it was lost sight of in the clouds, and the aëronauts also lost sight of the earth, being buried in a thick vapour. In their progress an unusual agitation of the air, somewhat like a whirlwind, suddenly turned the machine three times from the right to the left, and the shocks were so violent that they were prevented from using any of the means prepared for its direction, the *storm tearing away the silk stuff of which the helm was made.* The scene by which they were surrounded was truly appalling. An unbounded ocean of shapeless clouds rolled one upon another beneath, and seemed to forbid their return to the earth, which was still invisible. The agitation of the balloon became greater every moment, while a gust of wind from below drove it upwards to the extremity of the vapour, when the appearance of the sun showed them the existence of Nature, but now both the heat of the sun and the diminished density of the atmosphere occasioned such a dilatation of the gas, that the bursting of the balloon was every moment expected, and still they were ascending, the mercury standing at 24·36 inches, showing their present position to be five thousand feet above the surface of the earth. While in this frightful condition the Duke of Chartres made two inci tions in the balloon, which caused a rent of six or eight feet, and the inflammable gas escaping, they descended with great rapidity, seeing at first no object on earth or in the heavens; but presently the fields appeared, and a lake into which they were likely to plunge, but throwing out about sixty pounds weight of ballast they were saved from the watery element, and all landed on *terra firma* unhurt. Notwithstanding the dangers to which they were exposed, they spoke in the highest terms of the pleasures of their expedition.

On the 7th of January, 1785, Mr. Blanchard, accompanied by Dr. Jeffries, performed his sixth aerial voyage, by actually crossing the British Channel from Dover to Calais. They were provided with books and instruments and provisions for a lengthy trip and numerous experiments, but to save themselves from the sea they had to part with all, even some of their clothes, in order to lighten their weight, the balloon having parted with its gas, and thereby lessened its ascending power; but eventually they neared the French coast, cleared the cliffs and houses, and landed in the forest of Guiennes. As a reward for this voyage the king of France presented Mr. Blanchard with a gift of 480*l.*, and granted him a pension of 48*l.* a-year.

As intimated at the head of this article, there has been of late enough—even more than enough, of cloud-land voyaging. And although the daily and other papers have "reported progress" with an evident anxiety to supply every unit of interest which could be collected, still there has been quite a famine of even readable intelligence. No glowing description of London streets with its thousands of little animals bustling about—its churches, and monuments, and palaces—its Thames and shipping—its great extent and enchanting appearance, which must, even from the wicker basket of a balloon, present a picture superbly vast and magnificent. This dearth, however, may arise from the fact that literary aëronauts are scarce—they believe more in talking about clouds and stars, than in actually going up to kiss them. But one little incident is worth recording. A gentleman who had a genuine taste for this kind of travelling and means of observation, was fortunate enough to catch a prize ticket at one of the Vauxhall lotteries, and in company with six others and Mr. Green, who is the Wellington of balloons—for that night he made his five hundredth ascent—took their seats, and the signal being given, the twenty men who held the buoyant globe let go their charge, and in an instant they were mounted high on air, reaching the altitude of five thousand feet. London, that world in miniature, was beneath—the sight destroyed their fear, it was so new and inspiring. In passing over the Surrey Zoological Gardens, they distinctly heard its sweet and mellifluous music—and how delightful that would be—and still rising, they were soon away from earth immersed in the clouds. They were now fifteen thousand feet, or three miles, above *terra firma*, but they were still loyal subjects and felt as such—"they drunk to the health, and sang, God save the Queen."

We have dwelt chiefly upon those particulars, which supply the early history of an art which, though then exceedingly wonderful, has now become a thing of every-day occurrence; the chief wonder at this moment being that so few accidents occur, and that the authorities do not interfere to prevent those daring exhibitions which are continually being made, with no other object, apparently, than to gratify a morbid love of excitement and pander to the childish tastes of a gaping and thoughtless crowd. Efforts, however, have recently been made to give a scientific character and utility to ballooning. While Madame Poitiven has been gracefully descending, for the distance of a mile, with her parachute, and exciting the utmost curiosity of those who subsist upon that kind of element; and while M. Poitiven has been ministering to the cultivated tastes of the most enlightened city of the world by dragging up after him, by means of belts and other apparatus, horses and



A PARACHUTE.

bulls—the asses all being left below—it is refreshing to find that others have had an eye upon the means of advancing the interest of science, and that it is not unlikely that aërostation may yet be redeemed from those disgraces which have so often shrouded its glory; and in some measure deterred more respectable and worthy aspirants from using it as a means of revealing those mysteries of Nature which, even in the atmosphere, there is reason to believe are still in great abundance hidden from human sight.

WONDERFUL FLYING ANIMALS.

The faculty of flying is more wonderful than, from its commonness, it is usually reputed. We see birds on the wing everywhere, from the eagle, cleaving with strong pinion the thin air above the mountain-top, to the swallow, darting like an arrowy meteor through the low sedges. It is not our purpose here to describe the entire mechanism of a bird's flight; for though the act of flight, in all its varieties of hurried sweeping—darting after prey, floating like a mote in the sunbeam, or jerking along at a low elevation—is essentially a movement full of wonder, it is still in its mechanical detail too recondite to be considered here.

Our object is to notice a few of the more remarkable instances of flight, as exhibited in creatures not of the bird construction, and which are so curious as to merit notice here. The first of these, the Bat, is well known as a native of this country. It is about the size of a mouse, has long toes attached to the fore-feet, connected by their membranes, extending to the hind-legs, and from them to the tail. The membranes are of a dusky colour: a mouse-coloured fur, tinged with red, covers the body, which is two and a half inches in length; the eyes are very small, and the ears like those of a mouse. They are true mammals—that is, they bring forth their young alive, and suckle them for some time after birth. The wings of the bat, like those of all other flying animals which are not true birds, are composed of a membrane stretched between the legs, whereas the wings of a bird are formed of suitably arranged pinions and quills, springing from the joints of the hand, the legs being quite free. The wing of the bat is very commonly spoken of as a wing of leather, and the idea attached to this term undoubtedly is, that it is composed of a callous membrane; that it is an insensible piece of stuff, like the leather of a glove or of a lady's shoe; but nothing can be further from the truth. If one were to select an organ of the most exquisite delicacy and sensibility, it would be the bat's wing; it is anything but leather, and is perhaps the most acute organ of touch that can be found, though it is not easy to understand why it should be so. Spallanzani, a philosopher as noted for his extreme cruelty as for his ingenuity and love of research, had observed that bats could fly with great certainty, in rooms however dark, without striking against the walls. He found that when their eyes were covered they could fly with as much precision as before, and even when their eyes were put out no alteration in this respect was observed. When branches of trees or threads were suspended from the ceiling, they avoided them, nor did they even brush the threads as they flew past or between them; and even when the space between was too small to admit their expanded wings, they contracted the latter so as to suit their dimensions to the breadth of the passage. Spallanzani thought that the bat must possess a sixth sense. The organs of vision had been destroyed, and therefore it could not be by sight that they avoided all obstacles. In many individuals the ears were stopped, so that it could not be by hearing. In others the nostrils were stopped, so that it could not be by smelling; and taste is out of the question.

The following remarks from Cuvier are sufficiently demonstrative that it is by the acuteness of the sensation of touch in the wing, and not by any additional sense, that the phenomenon is to be accounted for. "The bones of the metacarpus, and the phalanges of the four fingers which succeed the thumb, are excessively elongated. The membrane which unites them presents an enormous surface to the air; the nerves which are distributed to it are numerous, and minutely divided; they form a network very remarkable for its fineness and the number of its anastomoses. It is probable that, in the action of flight, the air, when struck by this wing, or very sensible hand, impresses a sensation of heat, cold, mobility, and resistance on that organ, which indicates to the animal the existence or absence of obstacles which would interrupt its progress. In this manner blind men discover by their hands, and even by the skin of their faces, the proximity of a wall, door of a house, or side of a street, even without the assistance of touch, and merely by the sensation which the difference in the resistance of the air occasions."

The woods of South America produce a very formidable bat, the extent of whose wings is about four feet, and the body as large as that of a fowl. This bat, to which Linnæus has given the name of Vampire, on account of its inclination to suck the blood both of men and cattle, resides in the hollow trunk of some large, decayed tree, where it remains till the twilight calls it forth to seek its prey. Many extraordinary accounts have been given of this bloodthirsty animal. It is said to attach its tongue to the vein of a sleeping person with so much dexterity as not to be felt, at the same time fanning the air with its large wings, and thus producing a sensation so delightfully cool, that the sleep is rendered even more profound, and the unfortunate person almost bled to death before the morning. Captain Stedman, during one of his military excursions through the woods of Surinam, was bitten by one of these creatures while sleeping in his hammock. He was extremely alarmed one morning, about four o'clock, when he awoke, and found himself weltering in congealed blood, without feeling the least pain. He has thus described the manner in which they inflict the wound—"Knowing, by instinct, that the person they intend to attack is in a sound slumber, they generally alight near the feet, where, while the creature continues fanning with his enormous wings, which keeps one cool, he bites a piece out of the great toe, so very small, indeed, that the head of a pin could scarcely be received into the wound, which is consequently not painful; yet through this orifice he continues to suck the blood until he is obliged to disgorge. He then begins again; and thus continues sucking and disgorging until he is scarcely able to fly, and the sufferer has often been known to sleep from time into eternity. Cattle they generally bite in the ear, but always in places where the blood flows spontaneously. Having applied tobacco-ashes as the best remedy, and washed the gore from myself and my hammock, I observed several heaps of congealed blood all round the place where I had lain, upon the ground, on examining which the surgeon judged that I had lost at least twelve or fourteen ounces during the night."

There is reason to believe that this thirst for blood is not confined to the bats of one continent, nor to one species, since at Java they seldom fail to attack those persons who lay with their feet uncovered. It is therefore very unsafe to rest either in the open air, or to leave open any entrance to these dangerous animals. In some places they are extremely numerous. Mr. Foster tells us that he has seen five hundred

1. The Bat 2. Flying Macauco. 3. Flying Squirrel 4. Flying Dragon.